NATIONAL CAR BUILDER

VOLUME XIV.
NUMBER 8.

DEVOTED TO THE INTERESTS OF RAILWAY ROLLING STOCK.

$1.00 PER ANNUM
SINGLE NUMBERS, TEN CE…

NEW YORK:
Morse Building, 140 Nassau St.

AUGUST, 1883.

Entered at the Post Office at New York N. Y., as Mail Matter of the Second Class.

CHICAGO
144 N. Clark Street.

SELECT FURNITURE
Antique Designs.
SPANISH AND
VENETIAN LEATHERS.
Charles R. Yandell & Co.
INTERIOR DECORATIONS,
Choice Curtain Materials.
No. 6 East 18th Street,
New York.

FOR CARS.

Cold drafts around car windows and doors, also **Dust** and **Cinders** entirely **excluded**, and **Rattling** sashes stopped by **Browne's** Metallic and Rubber Window and Door Bands, used 15 years on Drawing Room, Sleeping and Passenger Cars in U.S. and Europe — Wagner, Pullman and all R. R. Co.s and Car Builders. Samples mailed free.

Pat. Metallic Weather Strip Co.
924 Broadway, N.Y.

VOSE
Graduated Springs
FOR
CITY, FREIGHT & PASSENGER
CARS.
RICHARD VOSE,
13 Barclay St., NEW YORK.

GILL CAR
M'F'G CO.,
Columbus, Ohio.
Make the best CARS and WHEELS.

EO. WESTINGHOUSE, Jr., President. T. W. WELSH, Superintendent. JOHN CALDWELL, Treasurer. W. W. CARD, Secretary. H. H. WESTINGHOUSE, General Agent.

THE WESTINGHOUSE AIR-BRAKE COMPANY,
Pittsburgh, Pa., U. S. A.,
MANUFACTURERS OF THE
WESTINGHOUSE AUTOMATIC BRAKE,
WESTINGHOUSE LOCOMOTIVE DRIVER BRAKE,
VACUUM BRAKES (Westinghouse & Smith Patents),
WESTINGHOUSE FREIGHT BRAKE.

The Automatic Freight Brake is essentially the same apparatus as the Automatic Brake for passenger cars, except that the various parts are one piece of mechanism, and is sold at a very low price. The saving in accidents, flat wheels, brakemen's wages and the increased speed possible with perfect safety, will repay the cost of its application within a very short time.

The "AUTOMATIC" has proved itself to be the most efficient train and safety brake known. Its application is instantaneous; it can be operated from any car in the train, if desired, and should the train separate, or a hose or pipe fail, it applies automatically. A GUARANTEE is given customers against LOSS from PATENT SUITS on the apparatus sold them.

FULL INFORMATION FURNISHED ON APPLICATION.

GEORGE WESTINGHOUSE, Jr., President.
C. H. JACKSON, Vice-President and General Manager.
ROBERT PITCAIRN, Treasurer.
ASAPH T. ROWAND, Secretary.
HENRY SNYDER, General Agent.

THE UNION SWITCH AND SIGNAL CO.,
A CONSOLIDATION OF
The Union Electric Signal Co., of Boston, Mass., and of the Interlocking Switch & Signal Co., of Harrisburg, Pa.
Sole Owners and Manufacturers of the only Practically Successful System of
OPERATING RAILROAD SIGNALS AUTOMATICALLY,

Also of Apparatus for Operating and Interlocking Switches, Signals and Gates by Levers, Hydraulics, Pneumatics or Electricity. Also Manufacturers of **FROGS, CROSSINGS, SWITCHES AND SWITCH STANDS.** Plans, estimates and detailed descriptions, together with references to apparatus in practical operation, will be furnished upon application.

Office and Works, cor. Fayette St., Garrison Alley and Duquesne Way,
PITTSBURGH, PA.

GEORGE WESTINGHOUSE, JR., President. RALPH BAGALEY, Secretary and Treasurer. H. H. WESTINGHOUSE, Superintendent

THE WESTINGHOUSE MACHINE COMPANY.
General Sales Offices: 92 and 94 Liberty St., New York.
Works: 24th and 25th St. and Liberty Ave., Pittsburgh, Pa.
Manufacturers of THE WESTINGHOUSE STEAM ENGINE, THE ALDEN CRUSHER AND PULVERIZER, DAMASCUS BRONZE. See illustrated advertisement on cover 2.

Threshers' Railway Varnishes.
Unsurpassed in Quality.
Established 1858.
Manufactured by
Thresher & Co.,
Dayton, O

Warranted Superior to any Steel in the Market, either English or American, for every purpose. Send for Circular and Price List.
CHROME CAST STEEL.
CHROME STEEL WORKS,
Kent Av. & Keap St., Brooklyn, E.D., N.Y.

ANDREW KLOMAN,
A. C. KLOMAN. C. H. KLOMAN.
TESTAMENTARY TRUSTEES
Pittsburgh, Pa.,
CAR TRUCK CHANNELS
For all patterns of Iron Car Trucks
CORRESPONDENCE SOLICITED

EMPIRE CAR ROOFING CO.,
GALVANIZED CORRUGATED IRON.
Flexible Joint, Sectional Car Roofing.
30,000 ROOFS IN USE.
SATISFACTION GUARANTEED.
R. B. CROUCH,
Sec'y. Treas. and Gen. Manager.
264 S. WATER STREET, CHICAGO.

CLIFF & RIGHTER CO.
(Limited.)
CHAS. D'W. GIBSON, Pres. EDMUND K. RIGHTER, Sec
GEO. B. SLOAN, Treas. EDWARD CLIFF, Sup't.
MANUFACTURERS OF
RAILWAY
CAR SPRINGS.
OSWEGO, N. Y.,
AND
38 CORTLANDT STREET,
NEW YORK CITY.

CAR SEATS.
GEORGE BUNTIN & CO.,
SOLE MANUFACTURERS OF
Buntin's Patent Car Seats,
AND NICKEL PLATED ARM CAPS, IN USE ON RAILROADS GENERALLY.
NO. 1,042 Ridge Ave., PHILADELPHIA.

ESTABLISHED 1850.
TROY MALLEABLE IRON CO.
MANUFACTURERS OF
REFINED AIR FURNACE MALLEABLE IRON.
Castings for General Railroad Work a Specialty.
TROY, N. Y.

HALL RAILWAY SIGNAL CO.,
MERIDEN, CONN.,
SOLE PROPRIETORS OF THE ONLY COMPLETE AND RELIABLE SYSTEM OF
AUTOMATIC ELECTRIC RAILWAY SIGNALS,
Comprising Visual and Audible Signals for Stations, Switches, Crossings, Draw-Bridges, Block Sections, etc., etc.
Special attention is called to our system of
INTERLOCKING OF ELECTRIC SIGNALS
For grade crossings, junctions, etc., rendering collisions at such points impossible.
Full information with Plans and Estimates furnished on application.

PALMER, PARKER & CO.,
MAHOGANY AND VENEERS,
AND ALL FOREIGN AND DOMESTIC CABINET WOODS.
MILL AND WAREROOMS:
PORTLAND, Cor. TRAVERS ST., BOSTON, MASS.
Send for Price List.

AMERICAN WIRE NAIL CO.
FOR ROOFING AND SIDING
USE THE
BARBED WIRE NAIL.
Ask for Sample.
AMERICAN WIRE NAIL CO.,
COVINGTON, - - - - - KENTUCKY

THOS. F. GRIFFIN & SONS,
BUFFALO, N. Y.,

GRIFFIN CAR WHEEL CO.,
DETROIT, MICH.,

GRIFFIN & WELLS FOUNDRY CO.,
CHICAGO, ILL.,

MANUFACTURERS OF
CAR WHEELS AND CASTINGS. See advs. on back cover

IRON CLAD PAINT.

TRADE
IRON CLAD PAINT
MARK.

Trade-Mark Patented.

This Paint is used by nearly all the Railroads in the Country.

Used by L. S. & M. S., Wabash R'y, C., C., C. & I. R'y, C. & P. R'y, C., H. & D. R. R., Cincinnati Southern R'y, N. Y., L. E. & W. R'y, (Erie), Southern Central R. R., Canada Southern, Mobile & Ohio, N. O. & Mobile, Macon & Brunswick, Penn. R. R., C., M. & St. P. R'y, A. & N. R'y, R. & D. R'y, Carolina Central, P., C. & St. L. R'y, P. & E. R. R., M., L., S. & W. R'y, K. & D. M. R'y, W. C. & A. R. R., M., I. & N. R'y, N. C. & St. L., N. I. & E. R. R., I. & G. N. R. R., etc., etc.

IRON CLAD PAINT CO. Cleveland Ohio.

PRINCE'S
72lbs.
Metal in the 100 lbs.
WARRANTED FIRE PROOF
300 lbs.
N. Y.
METALLIC PAINT.

Established 1858.

THE
Prince Manufacturing
COMPANY,
SOLE MANUFACTURERS OF

Prince's Metallic Paint.

The best Paint in the World for Iron, Tin and Wood.

Send for a Circular to

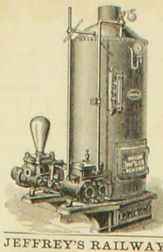
71 Maiden Lane, N. Y.

PENFIELD BLOCK CO.

Pulley Blocks and Iron Sheaves.
Phosphor-Bronze Self-Lub. Sheaves
Pushers, Giant Car, $5.00 each.
Poor's Manual, 1880-81 and 82. See p. 53.
Please write for lists, prices, etc.

LOCKPORT, N. Y.

WORTHINGTON STEAM PUMPS.



SINGLE AND DUPLEX.

SPECIAL PATTERNS
FOR
Railway Tank Service.

Adopted by the Principal Railroads of the Country.

SEND FOR CIRCULAR.

HENRY R. WORTHINGTON,
NEW YORK. BOSTON. ST. LOUIS.

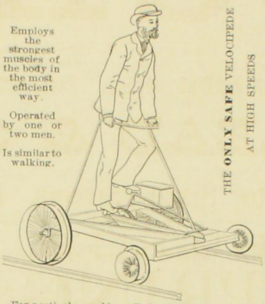
JEFFREY'S RAILWAY VELOCIPEDE

UNEQUALED FOR SPEED AND CAPACITY.

Employs the strongest muscles of the body in the most efficient way.

Operated by one or two men.

Is similar to walking.



THE ONLY SAFE VELOCIPEDE AT HIGH SPEEDS

For particulars, address T. B. JEFFREY, 40 South Canal St., Chicago, Ill.

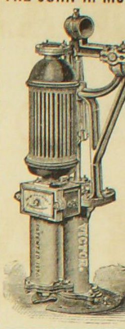
ESTABLISHED 1837.

A PURVES & SON,

DEALERS IN

Scrap-Iron, Metals and Machinery, cor. South and Penn Streets, Philadelphia, offer for sale, in lots to suit, Red or Yellow Heavy Scrap Brass; Ingot Brass, best qualities; Ingot Gun Metal made strictly from old cannon; Steam Pumps, Shafting Pulleys, etc.; Machinery and Tools, various descriptions; Old Steel Railway Axles 4 to 5½ inches diameter, suitable for Steam Engine Builders, Machine Tool Makers and others. Cash paid for Scrap Iron and Metals.

THE JOHN H. McGOWAN COMPANY,



Cincinnati,
OHIO,

Manufacturers of
"VICTOR,"
"McGOWAN"
AND
"Buckeye"
RAILROAD
PUMPS,
IRON PIPE;
AND
FITTINGS.

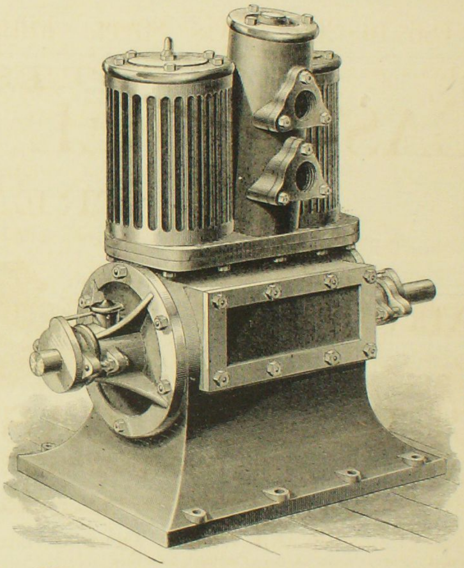
RIVAL STEAM PUMPS.

And BOILER FEEDERS.
John H. McCowan & Co., Cin'ti, O.

Geo. Westinghouse, Jr., Pres.
H. H. Westinghouse, Vice-Pres.
Ralph Bagaley, Sec. and Treas.
Wm. Lee Church, Gen. Agent.
Harris Tabor, Supt.

THE WESTINGHOUSE ENGINE

Send for Illustrated Circular.

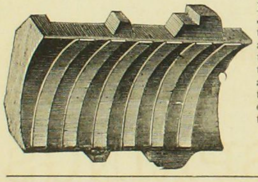


Requires Neither Adjustment, Lining, Keying Up, Packing, Oiling or Wiping;
2 TO 150 HORSE-POWER.

The Westinghouse Machine Company,
92 AND 94 LIBERTY STREET, NEW YORK.
14 S. CANAL STREET, CHICAGO.
Works at Pittsburgh, Pa.

The Leroy Journal Bearing Co.,

145 BROADWAY NEW YORK CITY.



Has the **SOLE RIGHT** to manufacture and sell **JOURNAL BEARING BRASSES** under Letters Patent issued to T. V. Leroy, Nov. 18, 1879, and reissued Feb. 17, 1880, Aug. 16, 1881. Testimonials, which may be seen at the office of the Company, show our brasses to be the Best and Most Economical in use. We claim that their use saves one-third in oil, and two sets will outwear three of any other brasses. Those interested in Railroads will do well to examine.

Address

GEO. W. McLEAN,
President.

ATTENTION!

CAR ROOFERS & CAR-BUILDERS.

If you wish to use a first-class article of Tin Roofing, write to

N. & C. TAYLOR CO.,
PHILADELPHIA,

and get their price on the only **Redipped** or **Extra Coated** Roofing Tin made. The brand on the boxes is

"OLD STYLE"
Double Coated Roofing Tin.

All the prominent roofers are using it.

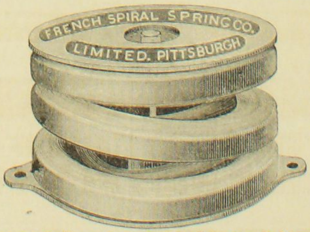
Send for samples and prices.

FRENCH SPIRAL SPRING CO. (LIMITED),

MANUFACTURERS OF

SPIRAL RAILWAY CAR SPRINGS,

Street Car, Buffer, Freight Bolster, Journal and Equalizing Bar Springs.



Pennsylvania Railway Co.'s Standard 20-ton Bolster Spring.

BRAKE RELEASE, SWITCH, VALVE AND MACHINERY SPRINGS FROM BEST CRUCIBLE STEEL.

Aaron French, Chairman. Geo. W. Morris, Sec'y. Calvin Wells, Directing Manager. Frank S. Layng, Treas. Walter P. Hansell, Sup't.

Corner of Twenty-Sixth and Liberty Streets, - - - - - PITTSBURGH, PA.

NEW YORK; 115 Broadway, Room 88; H. A. LITTLE, Agt.
BOSTON: 52 Mason Bl'g; JOHN KENT, Agt.
CHICAGO; 246 Clark Street; GEO. W. MORRIS.
ST. LOUIS; 209 N. Third Street; M. M. BUCK & CO., Agents.

To MASTER CAR-BUILDERS.

YOUR ATTENTION IS INVITED TO OUR LARGE AND VARIED STOCK OF

HARDWOOD LUMBER and VENEERS,

OUR OWN MANUFACTURE, EMBRACING CHOICE SHADED AND FIGURED

MAHOGANY

IN VENEERS, PANEL THICKNESSES, ETC.

Stock for Head Linings, etc., and all other desirable woods for CAR BUILDING purposes. Reasonable prices. Sample order solicited.

GEO. W. READ & CO.,

186 to 200 Lewis Street, Fifth to Sixth Streets, E. R., New York.

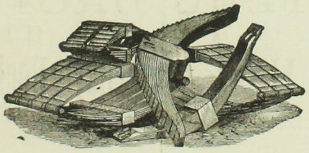
CALVIN WELLS. AARON FRENCH.

PITTSBURGH CAST-STEEL SPRING WORKS

A. FRENCH & CO.,

MANUFACTURERS OF

EXTRA TEMPERED, LIGHT ELLIPTIC



CRUCIBLE CAST-STEEL SPRINGS,

WITH PATENT HOT COMPRESSED BANDS FOR RAILROAD CARS AND LOCOMOTIVES.

UNITED STATES CENTENNIAL COMMISSION, OFFICIAL REPORT.—Diploma and Medal awarded for Good Design, Excellence of Workmanship and Material, Uniformity of Action and Durability.

OFFICE AND WORKS: Corner of Liberty and Twenty-first Streets, PITTSBURGH, PA.

H. A. LITTLE, Room 88, Boreel Building, New York; JOHN KENT, 52 Mason Building, Boston; GEORGE W. MORRIS, 246 Clark Street, Chicago; M. M. BUCK & CO., 209 North Third Street, St. Louis, Mo., Agents.

CALVIN WELLS, President and Treasurer. JAS. K. VERNER, Secretary.

PITTSBURGH FORGE AND IRON COMPANY,

Office: TENTH ST., near PENN AVE.,

PITTSBURGH, PA.,

MANUFACTURERS OF HAMMERED

AND

LOCOMOTIVE AXLES

We make a Specialty of our well-known brand of Railway Axles marked "Special" from new iron, guaranteed to be purely fibrous, and to stand the regulation drop test of the Penna. R. R. Company.

ALSO,

BAR IRON & BOLTS,

Channel and Angle Iron, Bridge Bolts, plain and upset ends, all sizes, Track Bolts, Square and Hexagon Head Bolts, Rivets, Washers, Fish Plates, Etc.

HALL DOW, Prest. L. I. TODD, V. P. WM. DOW, Secy. C. A. HITCHCOCK, Supt.

UNION BRASS MANUFACTURING CO.,

CHICAGO, ILL.,

MANUFACTURERS OF

CAR HARDWARE.

Special Designs Furnished for the Interior Decorations of Day, Night and Parlor Coaches.

TRIMMINGS OF EVERY DESCRIPTION.

SOLE MAKERS OF

Niles' Patent Car Door Locks, **Morgan's Deck Sash Ratchet.**

MANSFIELD'S DECK SASH OPENER,
CAR SEATS OF EVERY DESCRIPTION,
ORME PATENT SAFETY VALVE,
TODD'S FREIGHT CAR LOCKS,
WOOD HEAD LININGS (in Oak, Bird's-Eye Maple and Birch),
COTTIER STREET CAR GONG.

BRASS JOURNAL BEARINGS A SPECIALTY.

DOOR HINGES AND LOCKS, WINDOW AND BLIND FIXTURES.

Basket Racks, Hoppers, Urinals, Engraved Glass, Saloon Fixtures, Switch and Freight Car Locks, Ventilators and Registers, Sleeping Car Trimmings and Fixtures, Mail and Baggage Car Trimmings, Street Car and Omnibus Trimmings.

MAKERS OF ALL DESCRIPTIONS OF

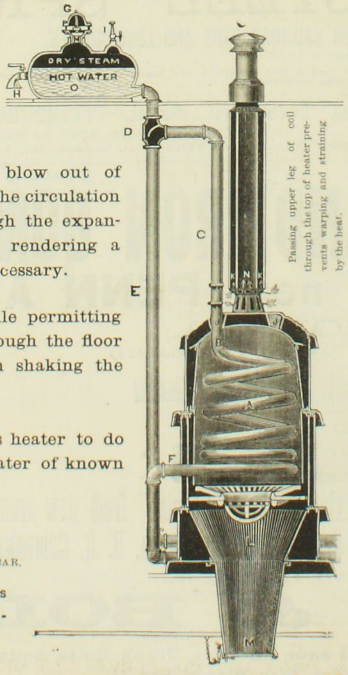
IRON AND STEEL DROP FORGINGS.

THE CELEBRATED

Searle Hot Water Heater,

FOR HEATING PASSENGER, PARLOR, DRAWING ROOM AND SLEEPING CARS.

When the fire is low the pipes may be refilled through the funnel cock, without requiring the pipes to be cooled off.


G
DRY STEAM
HOT WATER
H
O
D
C
E
F
A
M
Passing upper leg of coil through the top of heater prevents warping and straining by the heat.

Salt Brine cannot blow out of this heater, because the circulation does not pass through the expansion drum, thereby rendering a pressure gauge unnecessary.

No dust arises while permitting the ashes to pass through the floor of the car, or when shaking the grate.

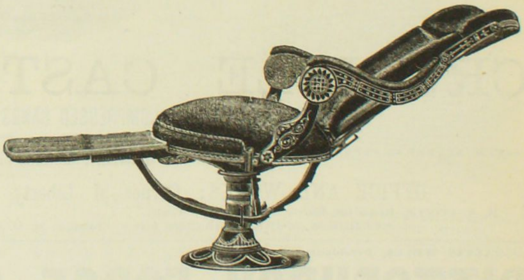
We guarantee this heater to do all that any car-heater of known repute will do.

FLOOR LINE OF CAR.

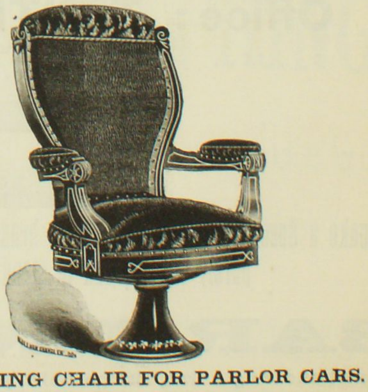
For Full Particulars Please Send For Descriptive Circular.

THE POPULAR

Hartley Reclining and Revolving Chair.



HEAD REST DOWN.



REVOLVING CHAIR FOR PARLOR CARS.

ADDRESS **UNION BRASS MFG. CO.,** 103 Ohio St., Chicago.

L. FRANKLIN F. GENET. JOHN S. SILVER.

GENET & SILVER,

MANUFACTURERS OF AND DEALERS IN

MAHOGANY,

GEORGIA PINE LUMBER AND TIMBER,

WALNUT, OAK, ASH, POPLAR,

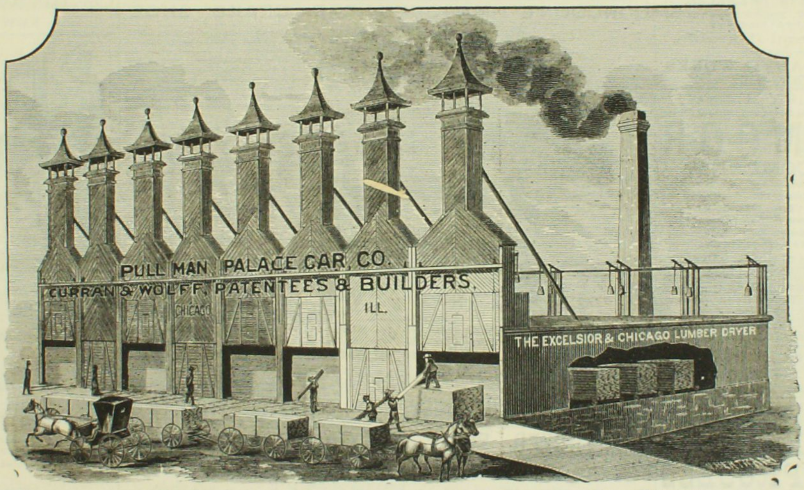
And Other Woods for Manufacturers, Railroads and Car-Builders.

FIFTEENTH ST. & NINTH AVE., NEW YORK CITY.

THE EXCELSIOR AND CHICAGO LUMBER DRYER IS BUILT UNDER 16 PATENTS.

PAYS FOR ITSELF EVERY YEAR.

Storing Capacity, 40,000 Feet Inch Lumber.


PULLMAN PALACE CAR CO.
CURRAN & WOLFF, PATENTEES & BUILDERS.
CHICAGO
ILL.
THE EXCELSIOR & CHICAGO LUMBER DRYER

DRYING 8,000 FEET PINE LUMBER

EVERY 24 HOURS.

RAILROAD COMPANIES AND CAR-BUILDERS WHO ARE USING THE EXCELSIOR AND CHICAGO LUMBER DRYER:

	Kilns.		Kilns.		Kilns.
C. & N. W. R. R. Co., Chicago	2	C., B. & Q. R. R. Co., Aurora, Ill	2	Harlan & Hollingsworth Co., Car-Builders, Wilmington, Del	2
B. & M. R. R. R. Co., Omaha, Neb	1	N. Y., O. & Western R. R. Co., Middletown, N. Y	1	Billmeyer & Small Co., Car-Builders, York, Pa	1
Norfolk & Western R. R. Co., Roanoke, Va	2	Louisville & Nashville R. R. Co., Louisville	2	Southern Car Co., Car-Builders, Knoxville, Tenn	1
Wilmington & Weldon R. R. Co., Wilmington, N. C	2	Pullman Palace Car Co., Chicago	8	Georgia Car Co., Car-Builders, Cartersville, Ga	1
Denver & Rio Grande R. R., Denver, Col	2	Wells & French Co., Car-Builders, Chicago	3	Gilbert & Bush Co., Car-Builders, Troy, N. Y	1
A. T. & S. Fe R. R., Topeka, Kan	2	Michigan Car Co., Car-Builders, Detroit, Mich	2	Ensign Mfg. Co., Car-Builders, Huntington, W. Va	3
Flint & Pere Marquette R. R. Co., Saginaw, Mich	1	Ohio Falls Car Co., Car-Builders, Jeffersonville, Ind	2	Peninsular Car Works, Car-Builders, Detroit, Mich.	2
C., M. & St. Paul R. R. Co., Minneapolis, Minn	2	Barney & Smith Mfg. Co., Car-Builders, Dayton, O	4	Northern Pacific R. R., Brainerd, Minn	2
Memphis & Charleston R. R. Co., Memphis, Tenn	1	Jackson & Sharpe Co., Car-Builders, Wilmington, Del	2	R. & D. R. R., Richmond, Va	2

L. WELLS, President. W. B. SHULTE, Vice-President. H. L. NORTON, Sec. and Treas. F. E. WALKER, Engineer

Wells & French Co., Bridge and Car-Builders, Chicago, Nov. 13, 1880.

Messrs. Curran & Wolff, City:

Gentlemen: In reply to your favor inquiring as to the two Dry Kilns you built for us two years ago, we take pleasure in saying that they have given us entire satisfaction.

We are drying upward of ten thousand feet of inch boards in each Kiln every twenty-four hours, and the lumber comes out of the Kilns free from checks or damage of any kind resulting from the process.

We have concluded to build another of your Dry Kilns, finding them indispensable in our business, and we do not see how any one doing business requiring a large amount of lumber can get along economically without them.

Yours truly, THE WELLS & FRENCH CO.

H. L. Norton, Sec. and Treas.

CURRAN & WOLFF, Proprietors and Builders, 39 and 41 FRANKLIN STREET, CHICAGO, ILL.

THE COWELL PLATFORM

Is the only device making **A CONTINUOUS FLOOR** between cars in motion.

IT ABOLISHES JERKING AND JOLTING, AND RUNS CARS STEADIER THAN ANYTHING AND EVERYTHING ELSE KNOWN.

We refer to the Flint & Pere Marquette R. R., which recently fully adopted our device, and to the following:

New York & Greenwood Lake Railway,
Superintendent's Office, Jersey City, May 22, 1882.

Robert Harris, Esq., *Vice Pres't N. Y., L. E. & W. Ry.:*

In accordance with instructions contained in your letter of April 4th, I delivered one combination car and two coaches to the Cowell Platform Company, which they promptly equipped with their patent buffer, since which time the cars have been in constant service.

On Friday, May 19th, the buffers were subjected to a severe test in the presence of several prominent railway officials, and performed all and more than the Cowell Company claimed for them. Matches and toothpicks were placed between the buffers, in order to see if in starting or stopping the buffers would separate enough to let an article so small pass between them. In all these tests the tension kept up to its work and made the platforms continuous. There was no perceptible jerk when starting, and several times a high rate of speed was reached when the engine was reversed, the air applied and a danger stop made without any jar or unpleasant sensation felt other than in making an ordinary station stop. I feel justified in saying, I believe the Cowell Buffer to be a great improvement over any other device I have seen, and should be pleased to have the coaches of the Greenwood Lake Railway Company equipped with this device; believing the saving in the end would justify the expense. J. H. Tinney, *Acting Supt.*

L. S. & M. S. Ry. Superintendent's Office, Eastern Division,
Chas. B. Couch, Sup't, Cleveland, O., April 7, 1882.

J. F. Herrick, Esq., *Sec'y and Treas. Cowell Platform and Coupling Co., Cleveland, O.:*

Dear Sir:—Having witnessed the exhibition of the "Cowell Platform and Buffer," at Cincinnati, March 22d, 1882, will say that in my opinion it is an excellent device. It is a safe and convenient Buffer, keeping the train very steady while in motion, especially over track of uneven surface and curves, there being no "lost motion" between the cars, which prevents the jolting and jarring occasioned by starting and stopping trains, as with the ordinary platform, thus saving much annoyance to passengers.

Yours truly, CHAS. B. COUCH.

S. L. Bell, Conductor on the Western & Atlantic R. R. says: "For two years I have been running a train of cars with your appliance, and I consider it the most practical and the most perfect device in use. It runs a train of cars steadier. I think, if properly managed, it will be a great saving to railroads, and I know affords much more comfort to the traveling public."

G. R. Carr, General Superintendent Columbus, Hocking Valley & Toledo R. R., says: "We prefer it to any in use that I have seen."

R. A. Cowell, Esq.: Meadville, Pa., June 7, 1881.

Dear Sir:—In reply to your inquiry as to my opinion of your platform, I think it the best in use, and I have seen nearly all of the improvements on railroads, as I have been in the transportation department for twenty-two years. I have been running a train on the N.Y., P. & O. R.R., equipped with your platform, for the past nine months, and I can see no wear as yet. I think it will last as long as the car itself. They certainly can be run at a higher rate of speed with greater safety than any other in use. It prevents that rolling motion at the ends of the coaches; it also prevents the jerking of the train in stopping and starting, which is so unpleasant. In fact, I cannot say too much in its favor. There are a great many good things about it that I have not time or space to mention. Very truly yours, J. W. BABCOCK,
Conductor N. Y., P. & O. R. R.

J. W. Thomas, General Superintendent Nashville, Chattanooga & St. Louis Railway, says:

"A train of two coaches and a baggage car, equipped with your Continuous Platform and Coupler, has now been in service on our road for over a year, running in our accommodation train 110 miles per day, and has given entire satisfaction, costing nothing for repairs during that time."

J. G. Sawyer, Master Car-Builder of the same road, says:

"I have been using your Continuous Platform and Drawhead in three of our cars on the N. C. & St. Louis road for the past ten months. They work in every way to our satisfaction. In that time they have cost the company neither trouble nor expense. I believe them to be a first-rate Platform and Drawhead."

B. V. HOLT, *Conductor.* J. G. SAWYER, *M. C. B.*

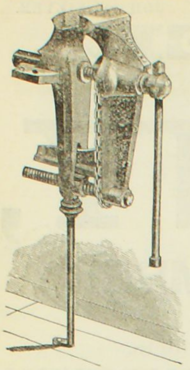
R. F. Smith, General Manager Cleveland & Pittsburgh R. R., says: "Your devices have given us entire satisfaction, having proved thoroughly efficient in accomplishing all the objects intended, and with marked economy as to maintenance."

Hiram Fowler, Superintendent Connecticut Valley R. R., says: "The Cowell Patent Platform has given perfect satisfaction."

Gen. P. Pease, of Ohio Central Ry, after seeing the device on the Cincinnati Southern Ry, says: "I was much pleased with the 'Cowell Platform.' For safety and ease in turning abrupt curves, superior to any I have seen."

For further particulars address
, W. STAGER, Gen. Manager.

THE COWELL PLATFORM & COUPLING CO., CLEVELAND, OHIO.



Our NO. 6 VISE opens 10 inches, with 8-inch Jaws; has solid forged screws 1¾-inch diameter, with 26-inch lever. We make 5 smaller sizes of same pattern. Special discounts to R. R. Companies and Car Companies on application.

THE
FISHER DOUBLE-SCREW VISE.

FULLY WARRANTED.

Stronger than any other Leg Vise,

AND ALWAYS PARALLEL.

The Best Vise for R. R. Machine Shops and Car Builders, and for all heavy work.

Accurate and Durable.

MADE ONLY BY

THE EAGLE ANVIL WORKS,
TRENTON, N. J.

W. BAILEY LANG,
Sole Agent in the United States and Canadas for the

LOWMOOR
IRON COMPANY.

Bar Iron of great strength and uniform quality
Plate Iron unequaled for Fire Boxes.
Tyres, Axles, Chain Rivets, Angle and **T Iron** and **Forgings** of all descriptions.

STAY-BOLT IRON.

A full assortment of Bar Iron in store.
50 Beekman St., N.Y. **13** Custom House St., Boston

STEEL RAIL BENDER

Steel Rail Benders, Track Drills, Track Jacks, Track Wrenches, Car Movers,

RAIL ROAD SUPPLIES.

E. P. DWIGHT,
407 Library St., - - Philadelphia, Pa.

A GREAT IMPROVEMENT.
Ketcham's Positive Ferro-Prussiate, or

REVERSED BLUE PROCESS

paper gives dark blue lines on a white background on first impression, instead of white lines on blue background, as in the ordinary blue process paper, thus making the *alte ing* of lines or the *coloring* of any part of the drawing perfectly simple and easy.
Prices: in rolls of 11 yards in length by 30 in. wide, $4; 36 in., $5; 43 in., $6 per roll.

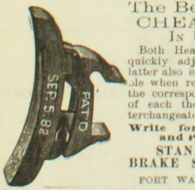
DRAUGHTSMEN'S MATERIALS.

Solar Printing and Blue Process Paper.
White and Manilla Drawing Paper in Sheets, Rolls or Mounted.
Tracing Cloth, India Ink, Pencils, Colors, Tacks, Instruments, &c., &c.

CHAS. F. KETCHAM & CO.,
Railroad Printers and Stationers,
27 AND 29 NASSAU STREET, NEW YORK.

"Standard" Brake Shoe & Head.

Light, Strong, Simple, Durable.



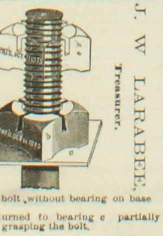
The Best and CHEAPEST IN USE.

Both Head and Shoe quickly adjustible, the latter also easily reversible when required. All the corresponding parts of each thoroughly interchangeable.

Write for circular and Prices.

STANDARD BRAKE SHOE CO.,
FORT WAYNE, IND.

Atwood Safety Nut Co.,
Springfield, Mass.



J. W LARABEE,
Treasurer.

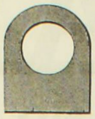
a, ATWOOD NUT on bolt, without bearing on base slots open.
b, ATWOOD NUT turned to bearing *c* partially closing the slots and grasping the bolt.

MORSE TWIST DRILL AND MACHINE COMPANY

MANUFACTURES
Patent Twist Drills, Machine Bits for Wood, Bit Stock Drills, Reamers, Standard Gauges, Milling Cutter and Special Tools, for use in Railroad, Car and Locomotive Shops. **NEW BEDFORD, Mass.**

VULCANIZED FIBRE COMPANY,

SOLE MANUFACTURERS OF



HARD & FLEXIBLE VULCANIZED FIBRE.

Flexible Vulcanized Fibre Dust Guards and Oil-Box Covers,

being absolutely unaffected by oil or heat, are far more durable and efficient than Leather, and much cheaper.

Office and Works; Wilmington, Del.

PINTSCH LIGHTING COMPANY,

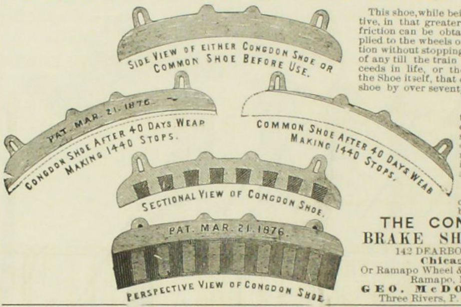
MOSCOW, 1872, Great Gold Medal. VIENNA, 1873, Progress Medal. ST. PETERSBURG, 1875, Gold Medal. CINCINNATI, 1881, Gold Medal.

Safety,
Economy,
Brilliancy.

19 William Street, New York.

H. HOWARD, Pres. F. KUHNE, Treas. W. K. JEWETT, Sec'y.

CONGDON'S IMPROVED CAR BRAKE SHOE.


SIDE VIEW OF EITHER CONGDON SHOE OR COMMON SHOE BEFORE USE.
PAT. MAR. 21. 1876.
CONGDON SHOE AFTER 40 DAYS WEAR MAKING 1440 STOPS.
COMMON SHOE AFTER 40 DAYS WEAR MAKING 1440 STOPS.
SECTIONAL VIEW OF CONGDON SHOE.
PAT. MAR. 21. 1876.
PERSPECTIVE VIEW OF CONGDON SHOE.

This shoe, while being more effective, in that greater uniformity of friction can be obtained when applied to the wheels of a train in motion without stopping the revolution of any till the train is at rest, exceeds in life, or the durability of the Shoe itself, that of the cast iron shoe by over seventy-five per cent.

Its durability, together with cheapness and simplicity of construction, recommend it in preference to any other in use

All communications should be addressed to

THE CONGDON BRAKE SHOE CO.,
142 DEARBORN ST.,
Chicago,
Or Ramapo Wheel & Foundry Co.,
Ramapo, N. Y.
GEO. McDOUGALL,
Three Rivers, P. Q., Canada.

HOT PRESSED NUTS.

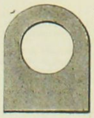
Specifications Solicited.

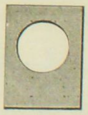
Empire Nut Company, Pittsburgh, Pa.

GELATINIZED FIBRE FLEXIBLE DUST-GUARDS.

Superior to Leather or "Vulcanized Fibre."

Keep the Oil in the Car-Boxes and Sand and Dust out of Them





They are not affected by oil, grease or petroleum; do not cut the axles, as grit does not adhere to them; keep their shape well and will outwear several leather ones. Cut to order of any desired thickness or pattern. Send drawing or sample for estimate. This material is **absolutely free from grit, and will not become brittle and break.**

NOW IN USE ON MANY LEADING RAILROADS, GIVING GENERAL SATISFACTION.

Master Car-Builders desiring to cut their own washers can be furnished with FLEXIBLE SHEET GOODS of any desired thickness; being uniform in quality and thickness, can be cut without waste.

BE SURE TO SEND FOR SAMPLES AND PRICES.

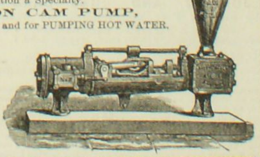
COURTENAY & TRULL,
SOLE AGENTS,
No. 15 Dey St., New York.

STEAM PUMPS

For Boiler Feeding and Fire Protection a Specialty.

THE IMPROVED DAYTON CAM PUMP,

Designed and built especially for BOILER FEEDING and for PUMPING HOT WATER.



Steam Pumps and Hydraulic Machinery
For Railroad Purposes.

The Combined Pump and Boiler, with Removable Water Cylinder.

The MOST POWERFUL FIRE PUMPS ever made. Every machine warranted. Over **1,800** in use. Send for Descriptive Circulars.

SMITH, VAILE & CO., Dayton, O.
CHICAGO HOUSE, 24 WEST LAKE STREET.

Manganese Bronze and Brass Castings,

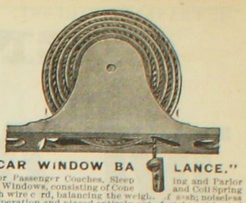
STRONGEST AND BEST IN MARKET.

FOR
ROLL NECK CAR JOURNAL
AND MACHINERY BEARINGS,

MASTER CAR BUILDERS STANDARD

ASLO,
Babbitt's Anti-Friction METAL,
MANUFACTURED BY

JOHN FITZSIMMONS, BRASS FOUNDER, 23 CARSON ST., PITTSBURGH, PA.



CAR WINDOW BALANCE."

For Passenger Coaches, Sleeping and Parlor Car Windows, consisting of Cone and Coil Spring with wire cord, balancing the weight of sash; noiseless in operation and placed entirely out of sight. Adopted by many of the leading roads. No car complete without them.

O. K. GARDNER, Manufacturer,
28 and Railroad Sts., Pittsburgh, Pa.

JOHN R. GRAHAM,

IMPORTER AND DEALER IN

ROSEWOOD & MAHOGANY

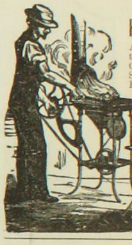
AND ALL OTHER
FOREIGN AND DOMESTIC

CABINET WOODS,

SUITABLE FOR CAR WORK.

Cor. 11th Ave. and 30th St.
NEW YORK.

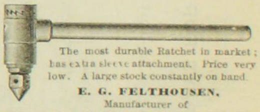
KEYSTONE
Portable Forges,



All sizes, for the lightest to the heaviest work, run by Chain Gear and Flat Belts. Strong, last and durable. For sale by

Keystone Portable Forge Co.
204 North Fourth St.,
PHILADELPHIA, PA.

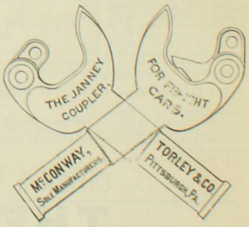
Patent Combination Ratchet Drill.



The most durable Ratchet in market; has extra sleeve attachment. Price very low. A large stock constantly on hand.

E. G. FELTHOUSEN,
Manufacturer of
HAND & AUTOMATIC CYLINDER OIL PUMPS,
Ball and Wheel Gauge Cocks, Flue Cleaners, etc.
Salesrooms, 59 and 61 Main Street;
Factory, 72-80 Washington Street,
BUFFALO, N. Y.

BRANCH OFFICES
New York - - - C. M. MORSE, Manager
Chicago - - - - RAZE & LUDLOW, Managers.


THE JANNEY COUPLER.
FOR FREIGHT CARS.
McCONWAY, SOLE MANUFACTURERS
TORLEY & CO. PITTSBURGH, PA.

JOEL H. MILLENER,
RAILROAD CROSS TIES
AND
TIMBER.

Ties, spring delivery, Lake Erie and Ontario Ports.

220 Main Street, Buffalo, N. Y.

THE
NORTH CAROLINA
CAR COMPANY.

Standard and Narrow-Gauge Freight Cars,
RALEIGH, N. C.

BOUND VOLUMES
OF
THE CAR-BUILDER
For 1880, 1881 and 1882.
PRICE, $3.00 EACH.

(THE BEST LUBRICATOR FOR JOURNALS OR BEARINGS MADE.)

CHALLENGE COACH GREASE
—AND—
HOT-BOX COMPOUND.

Guaranteed to run a car 5,000 miles with one greasing. We will furnish sufficient grease to make a thorough trial, and make no charge for same unless it gives absolute satisfaction.

CHICAGO, February 9, 1883.

W. S. CALHOUN & Co., CHICAGO—

DEAR SIRS: The following is a report of test made with "Challenge Coach Grease," under passenger coach No. 69 up to date: Car made 8,200 miles the first greasing (one box hot); removed journal bearing; applied more grease to the seven other bearings, and continued the test until car had made 20.600 miles. Average reduction by friction, 8 oz. per bearing; average mileage to 1 oz. of reduction, 2,575 miles. Amount of grease used since being packed, 4 oz. to each box or two applications, or 8 oz. to each box in all during test.

Yours truly,
A. J. BIRD, Foreman Passenger Depot,
C., R. I. &. P. Railway.

I certify that the above report is correct,
R. H. CHAMBERLAIN, Div. Supt. Illinois Div.

Approved: B. K. VERBRYCK, M. C. B.,
C., R. I. & P. Railway.

GRAND RAPIDS, March 6, 1883.

W. S. CALHOUN & Co., CHICAGO—

DEAR SIRS: Referring to your "Challenge Coach Grease," for railway coaches, I have this to say: that, after a thorough trial, I find it far superior, in every respect, to any grease we have yet used. The journals of the coach that were packed with your grease on December 9 last, on examintion to-day look as well as when first filled. Said coach has run 180 miles every day since journals were filled, viz., Dec. 9. I am perfectly satisfied that the "Challenge Coach Grease" will do all that is claimed for it, and have recommended its use on all our coaches.

Respectfully yours,
MAT. SCHOOF, Car Examiner,
For Chicago & West Michigan Railroad.

Price, 45 Cents per Gallon, f. o. b. Chicago. Address

W. S. CALHOUN & CO.,

Manufacturers and Jobbers of Oil and Waste, and Sole Agents for CHALLENGE COACH GREASE,

Correspondence solicited. 165 Jackson Street, Chicago, Ill.

EAMES VACUUM BRAKE CO.

RAILWAY TRAIN POWER BRAKES
BEST IN THE WORLD.
WATERTOWN, NEW YORK.

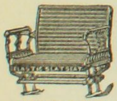
THE EAMES BRAKE is confidently offered as the most efficient, simple durable and the cheapest power Brake in the market. Can be seen in operation upon over 120 roads, and notably the N. Y. Elevated R. R., where it daily makes 69,277 stops.

ARE PREPARED TO SUPPLY AT LOW RATES BEST QUALITY. PHOSPHOR BRONZE CAR AND ENGINE BEARINGS.

PHOSPHOR BRONZE,
HOOKS SMELTING CO.
SUCCESSORS TO GEORGE K. TRYON SON & CO PHILADELPHIA.

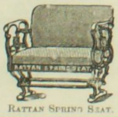
MEDAL AWARDED CENTENNIAL EXPOSITION 1876 FOR SUPERIOR QUALITY PHOSPHOR BRONZE CASTINGS.

HALE & KILBURN MANUFACTURING COMP'Y,
48 AND 50 NORTH SIXTH STREET, PHILADELPHIA, PA.,



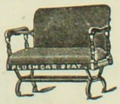
Lastic Slat Seat.

REFERENCES.
N. Y. C. & H. R. R. CO.
N. Y. ELEVATED R. R.
ILL. CENTRAL R. R.
PULLMAN P. C. CO.
PENN. R. R. CO.
N. Y. & N. ENG'D R. R.
BALT. & O. R. R.
AND ONE HUNDRED OTHERS.



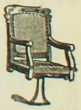
Rattan Spring Seat.

EXTENSIVE MAKERS
OF
PATENTED CAR SEATS
AND
SPRINGS.



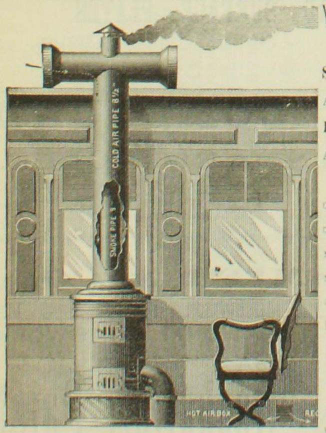
Spring Edge Seat.

ESTIMATES,
CIRCULARS
AND
SAMPLES FURNISHED
ON
APPLICATION.



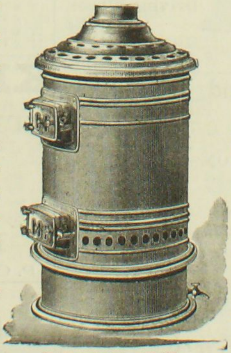
Parlor Car Chair

WINSLOW'S IMPROVED SAFETY CAR HEATER AND VENTILATOR.



A PERFECT SAFEGUARD AGAINST FIRE IN CASE OF ACCIDENT.

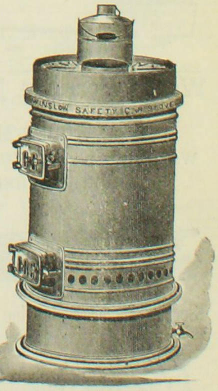
The Strongest and most Durable Stove made. The most economical, on account of the very large volume of air heated. Their use insures HEALTH, SAFETY AND COMFORT.



PASSENGER CAR STOVE.

For BAGGAGE, MAIL, EXPRESS, CABOOSE AND EMIGRANT CARS.

With Flat Top, arranged for trainmen to warm their dinner pails on, and Jacket made of No. 16 irons, so that they will not jam by baggage or mail coming in contact with them.



WINSLOW SAFETY CAR STOVE CO., Cleveland, O.

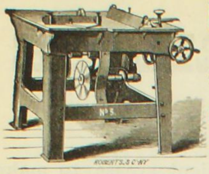
CLEVELAND, COLUMBUS, CINCINNATI & INDIANAPOLIS RAILWAY.

Evening trains leave CLEVELAND daily with Rotunda Sleeping Cars for COLUMBUS, CINCINNATI, INDIANAPOLIS, LOUISVILLE, TERRE HAUTE, EVANSVILLE, ST. LOUIS and all points West and South. Morning trains leave Daily, except Sunday, with Through Palace Coaches, for COLUMBUS, CINCINNATI, INDIANAPOLIS, LOUISVILLE, and ST. LOUIS without change. This is the only line making direct communication with all the Principal Trunk Lines of the East for NASHVILLE, MEMPHIS, NEW ORLEANS and all points in Texas, either by way of LOUISVILLE or ST. LOUIS. Direct connection at ST. LOUIS for all Railway Towns in Kansas, Nebraska and Colorado.

Equipment Comprises all Valuable Improvements.
THE BEST ROAD-BED AND SAFEST ROAD IN THE WEST.

E. B. THOMAS, General Manager. A. J. SMITH, General Ticket Agent.

CLEVELAND TWIST DRILL COMPANY,
COX & PRENTISS
24 and 26 West Street, - - - - Cleveland O
101 Chambers Street, New York.



No. 3 Wardwell Saw Bench.

ROLLSTONE MACHINE CO.

Wardwell Saw Benches a specialty.

These machines are in use in the car-shops of the Penn. R. R., B. & O., P. W. & B. B. & A. F. R., Mich. Central, and some fifty other of the largest shops in the country

Also, A HEAVY BAND SAW FOR CAR WORK.

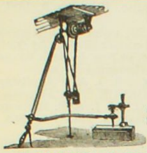
ROTARY, STATIONARY, BED & BUZZ PLANERS

And a large number of other machines for car work.

We are dealers in all kinds of Second-Hand Machinery, Engines, Boilers, Iron and Wood-Working Machinery.

Do not buy until you send for new descriptive list, stating just what you want enclosing stamp.

ROLLSTONE MACHINE CO., 131 WATER ST., FITCHBURG, MASS.



PORTABLE Machines for Use by Bridge, Engine and Boiler Makers.

PORTABLE Drilling, Tapping, Boring, and Reaming Machines

PORTABLE Machines for Wood Boring, Polishing, and Emery Wheel Grinding.

STOW FLEXIBLE SHAFT Co., Limited,

1505-1509 PENNSYLVANIA AVENUE,

PHILADELPHIA, - - PA.

BUCYRUS FOUNDRY & MFG. CO., BUCYRUS, OHIO

HAND CARS, PUSH CARS, MINE CARS,

RAILROAD AND MINE SUPPLIES,

BALLAST UNLOADERS,

CAR AND ENGINE Castings.

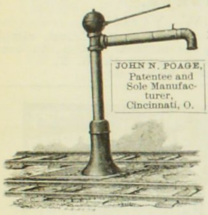
ALSO

SOLE MANUFACTURER UNDER LETTERS PATENT

OF THE

Thompson" Iron Steam Shovel, Wrecker & Derrick

AUTOMATIC WATER COLUMN.



JOHN N. POAGE,
Patentee and Sole Manufacturer,
Cincinnati, O.

"1882. STANDARD."

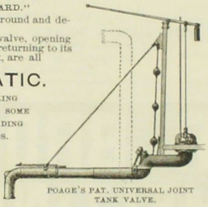
The Fireman draws it round and depresses the lever.

The acts of closing valve, opening and closing waste, and returning to its position parallel to track, are all

AUTOMATIC.

AND ARE BEING ADOPTED BY SOME OF THE LEADING RAILROADS.

INFRINGEMENTS ARE BEING PROSECUTED.



POAGE'S PAT. UNIVERSAL JOINT TANK VALVE.

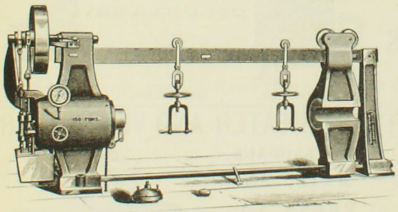
BETTS MACHINE CO.,

Wilmington, Delaware,

MAKERS OF

IRON AND STEEL WORKING MACHINERY

FOR RAILROAD AND CAR SHOP EQUIPMENT.

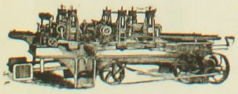


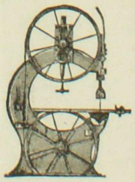
Drills,
Lathes,
Planers,
Slotters,
Axle Lathes,
Wheel Presses,
CAR-WHEEL BORERS,
Driving Wheel LATHES,
Quartering Machines.

Wood Working Machinery and Iron Tools.

S. A. WOODS MACHINE CO.,

WAREROOMS: 172 HIGH STREET, BOSTON.
91 LIBERTY STREET, NEW YORK.
61 SOUTH CANAL ST., CHICAGO.





Special Machinery for the use of Car-Builders and R. R. Shops.

TRADE MARK.

DENISON'S

Patent Cooling and Lubricating Compound,

For Cooling Hot Journals. We would especially call the attention of Railroad Men to this compound, as it will immediately Cool a Hot Journal while the Cars are in Motion, and no Journal will heat where the box is packed with it.

None genuine without this Trade Mark.

DIRECTIONS.—For Cars and Engines, pack the Box so that the Compound will come in contact with the Bearings and Journals, using waste saturated with oil.

Address letters and orders to

E. A GODDARD & Co., Agents,

P. O. Box, 3211. 176 Fulton St.,
NEW YORK.

STEEL CASTINGS

FROM 1-4 To 10,000 lbs. WEIGHT.

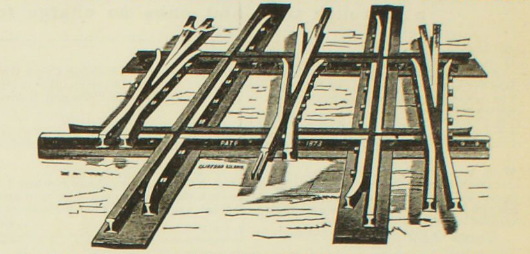
True to pattern, sound and solid, of unequaled strength, toughness and durability. An invaluable substitute for forgings or cast-iron requiring three-fold strength. Gearing of all kinds, Shoes, Dies, Hammer-Heads, Cross-Heads for locomotives, etc. 15,000 Crank Shafts and 10,000 Gear Wheels of this steel now running prove its superiority over other steel castings. CRANK SHAFTS, CROSS-HEADS and GEARING specialties. Circulars and Price Lists free.

CHESTER STEEL CASTINGS CO.,

Works: CHESTER, Pa. 407 Library St., PHILADELPHIA.

C. HUBBARD, Agent, 46 Cliff Street, New York.

ELLIOT'S PATENT STEEL RAIL FROGS AND CROSSINGS.



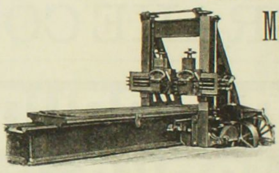
These Frogs and Crossings are made of steel rail, combined with a wrought-iron frame, and bound together transversely with strong bolts, which gives them great strength and durability without destroying their elasticity. They are connected at all ends by Fish-Plate Joints, and lie on the same tie surface as the running rail without any cutting of ties, thus saving a great deal of time and labor in putting in place on track.

Manufactured by H. & H. ELLIOT,
East St. Louis, Ill.

WM. B. BEMENT & SON,

PHILADELPHIA,

MANUFACTURERS OF



Metal Working Machine Tools

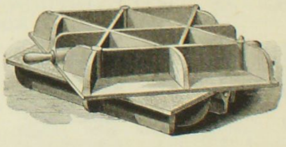
of all descriptions, and a great number of sizes, including

Steam Hammers, Steam and Hydraulic Riveters, Cranes, Punches and Shears, Bending Rolls, Plate Planers, etc.

BROWN & SHARPE MFG. CO.

PROVIDENCE, R. I.,

MANUFACTURERS OF THE



STANDARD SURFACE PLATES.

9″ x 9″	$12	12″ x 18″	$33
6½″ x 18″	18	16″ x 16″	40
10″ x 15″	25	10″ x 30″	45
14″ x 14″	30	24″ x 24″	88

KRUPP COMPOUND.

THE STANDARD COOLER.

This compound as a cooler and lubricator for **Hot Journals** is unsurpassed.

Is best applied as a dope by mixing well with waste saturated with oil, and packing close to the journal.

E. A. SMITH & CO.,

P. O. Box 1,145. Pittsburgh, Pa.

NATIONAL PAINT WORKS

WILLIAMSPORT, PA.

ONLY MANUFACTURERS OF

Asphaltum Paints

MIXED READY FOR USE.

IN ALL COLORS. Adopted and being used by many Prominent Railroads, Car and Bridge Builders in the United States. Using only the best Leads, Zincs, Minerals, proportion of Crude Asphaltum and all Coloring Materials, Ground in and Thinned with Pure Linseed Oil. Particular attention given to Railroad Car and Bridge Works Orders. Samples and Price-List furnished on application.

JOHN T. LEWIS & BROS.
WARRANTED PURE WHITE LEAD.
PHILADA.
TRADE MARK.
No. 231 South Front Street.
Manufacturers of White Lead, Red Lead, Litharge, Orange Mineral, Linseed Oil and Painters' Colors.

Important to Railroad Managers and Master Mechanics.
SIBLEY'S PERFECTION VALVE OIL.

More perfect lubrication insured, and entire freedom guaranteed from corrosion of cylinders and destruction of steam joints by fatty acids.

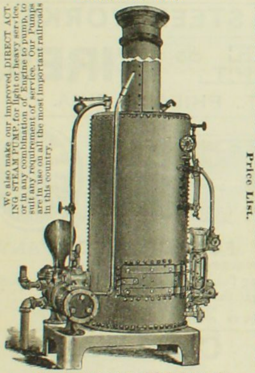
In exclusive use on 50 railroads.

References and prices furnished upon application.

☞ **Make exclusive specialty of the Manufacture of Valve and Signal Oils for Railroad use.**

SIGNAL OIL WORKS,
FRANKLIN, PA.
J. C. SIBLEY, President.

The Gordon & Maxwell Mfg. Co.,
Hamilton, Ohio



We also make our improved DIRECT ACTING STEAM PUMP, for light or heavy service, or in any combination of Engine to pump, to suit any requirement of service. Our Pumps are in use on all the most important railroads in this country.

Send for New 17th Annual Illustrated Catalogue and Price List.

Manufacturers of Special Machinery for
R. R. WATER-STATION PUMPING.

E. W. VANDERBILT, E. M. HOPKINS
VANDERBILT & HOPKINS,
RAILROAD TIES, CAR AND RAILROAD LUMBER, WHITE AND YELLOW PINE OAK, GUM AND CYPRESS.
No. 120 Liberty St., N. Y.
Boards, Plank and Dimension Lumber Sawed to Order.
Creosoted Lumber, Ties and Piles to Order.

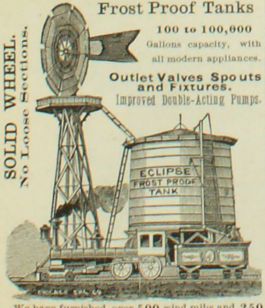
Eclipse System of Water Supply for Railroads.

ECLIPSE SOLID WHEEL WIND MILLS.

Tested 14 years. Perfectly self-regulating. Conceded by the leading railway companies of this and other countries to be by far the strongest, safest and most powerful wind mill made.

Frost Proof Tanks
100 to 100,000 Gallons capacity, with all modern appliances.
Outlet Valves Spouts and Fixtures.
Improved Double-Acting Pumps.

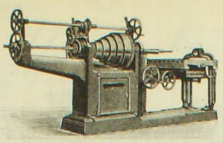
SOLID WHEEL.
No Loose Sections.



We have furnished over **500** wind mills and **250** complete water stations in 1881 to the leading railroads in the United States and Canadas. Two million feet of tank lumber constantly on hand. Our capacity is such that we can execute large orders promptly. Complete stations erected on trial when desired to test the correctness of our claims. Send catalogue and price-list.

ECLIPSE WIND ENGINE CO
W. H. WHEELER, Manager,
BELOIT WIS.

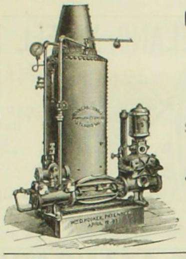
WILLIAM SELLERS & CO., PHILADELPHIA,



TURN-TABLES,
PIVOT BRIDGES,
SHAFTING.

Iron and Steel Working Machine Tools, for Railways, Machine Shops, Rolling Mills, etc.
BRANCH OFFICE, 79 LIBERTY STREET, NEW YORK.

THE HOOKER STEAM PUMPS,
FOR ALL PURPOSES.


W^m D. HOOKER, PATENTED APRIL 19 '81

COMPOUND CONDENSING PUMPING ENGINE
FOR WATER-WORKS.

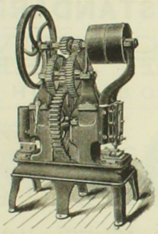
Railway Tank Pumps a Specialty.

SIMPLEST CONSTRUCTION AND HIGHEST DUTY.

Office and Works, 823 North Second St., St. Louis, Mo.

SEND FOR CATALOGUE.

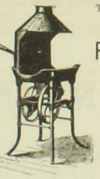
THE HOOKER-COLVILLE STEAM PUMP CO.



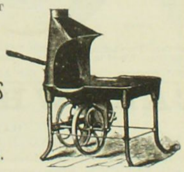
COMBINED
PUNCH AND SHEARS.
Prices from $625 to $1,000.
SIX SIZES MADE.

Warranted to be of greater capacity for the price than any other machine in the market.

IN USE AND INDORSED BY
C., B. & Q. R. R. CO.; UNION IRON & STEEL CO., CHICAGO;
WEIR PLOW CO. (3); BROWN CORN PLANTER WORKS.
MANUFACTURED BY
G. D. COLTON & CO.,
GALESBURG, ILL.
☞ Correspondence Solicited. State where you saw this ad.



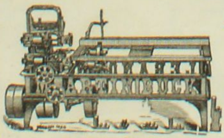
THE LARGEST AND BEST ASSORTMENT
OF
PORTABLE FORGES
AND
HAND BLOWERS
Made by any Manufacturer in the World.
Send for Catalogue and Prices to
EMPIRE PORTABLE FORGE CO.
Cohoes, N. Y., U. S. A.

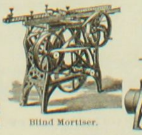


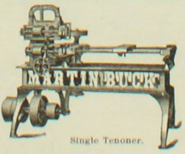
W. H. H. SMITH & CO.,
MANUFACTURERS OF
Car Sills, Bridge Timber and other Special Bills
Also Dealers in Car Flooring, Roofing
and Siding.
Mill and Office, Water Street, TOLEDO, OHIO.

WILMINGTON MALLEABLE IRON CO.,
MANUFACTURERS OF
REFINED MALLEABLE IRON CASTINGS.
General Railroad and Car Work a Specialty.
WILMINGTON, DELAWARE.

Railroad Journal Bearings
BRASS CASTINGS.
BABBITT METAL.
SOLDERS.
DEALERS IN
All Kinds of Metals.
J. J. RYAN & CO.,
62 & 64 West Monroe Street, Chicago.


Double Car Tenoner.


Blind Mortiser.



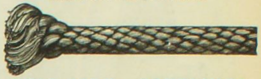
Single Tenoner.

Single, Double and Triple Tenons and Gaining done on the same machine; especially adapted to car work. Single Tenoners all iron, with carriage mounted on trucks; Blind Mortiser and Borer combined for fixed and rolling lats; Adjustable Groover Heads, and a full line of Wood-working Machinery.

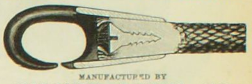
A. W. RIX, Successor to MARTIN BUCK, Lebanon, N. H.

STEEL CASTINGS,
RAIL-ROAD AND MACHINE CASTINGS
OF ALL KINDS FROM ½ LB TO 10 TON.
LOCOMOTIVE CROSS HEADS
AND GEARING A SPECIALTY.
EUREKA CAST STEEL CO.
No. 307 WALNUT ST. PHILADA.
WESTERN OFFICE 45 LASALLE ST. CHICAGO, ILL.

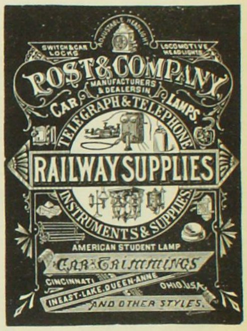
SOLID BRAIDED BELL CORD
PLAIN AND FANCY COLORS.



BELL-CORD COUPLINGS.



MANUFACTURED BY
SILVER LAKE CO.
HENRY W. WELLINGTON, Agent, BOSTON



POST & COMPANY
MANUFACTURERS & DEALERS IN
CAR LAMPS.
TELEGRAPH & TELEPHONE
RAILWAY SUPPLIES
INSTRUMENTS & SUPPLIES.
CAR TRIMMINGS
IN EAST-LAKE, QUEEN-ANNE
AND OTHER STYLES.
CINCINNATI OHIO, U.S.A.

RAILWAY SUPPLIES.

H. L. LEACH,
NEW ENGLAND AGENT
FOR
Nathan & Dreyfus—Oilers and Lubricators and Freidmann's Injectors and Ejectors; C. W. Pickering & Co.—Locomotive and Car Springs.

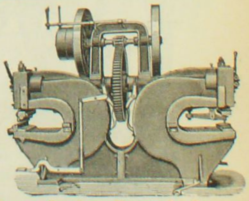
Boiler Tubes, Plate Iron and Steel Boilers, Tanks Machinists' Tools, Locomotive Frames, Crank-Pins Axles, Head Lights, Steam Gauges, Car Wheels Etc., Etc.

77 WATER STREET, BOSTON, MASS

THE STANDARD LUBRICATING OIL
OF AMERICA
FOR RAILROADS.
GALENA
ENGINE, COACH AND CAR OIL.
Gravity, 26°, 27°, 28°, 29°. Cold Test, 10° to 15° below zero.

No freezing in coldest weather, and entire freedom from hot journals at any time, as its exclusive use upon a majority of the leading railroads has demonstrated.

Showing Better Results than any Oil Extant.
REFERENCES FURNISHED ON APPLICATION.
GALENA OIL WORKS (Limited),
FRANKLIN, PA



Power Punches, Shears & Hammers.

We make over 100 sizes of Punches and Shears, Double and Single, varying from 500 to 36,000 pounds in weight, and adapted for every variety of work. The Double machines are equal to two Single ones, as each side is worked independently. Also

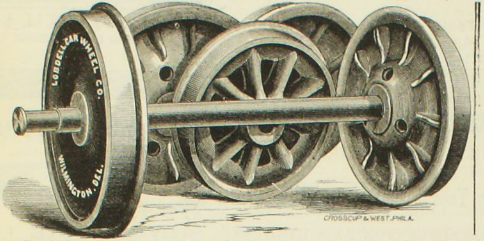
ADJUSTABLE HELVE
CUSHIONED HAMMERS
Of all sizes, Unequaled for Efficiency and Durability
THE LONG & ALLSTATTER CO.,
Hamilton O.

ESTABLISHED 1847.

A. WHITNEY & SONS'
CAR WHEEL WORKS,

PHILADELPHIA, PA.

LOBDELL CAR WHEEL CO. Wilmington, Del.

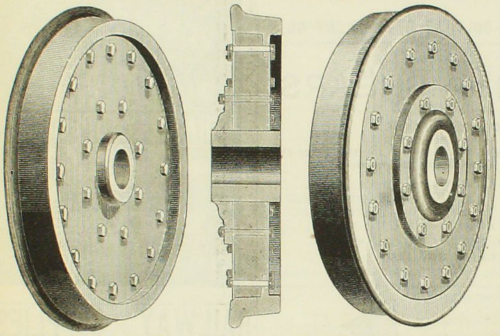

LOBDELL CAR WHEEL CO.
WILMINGTON, DEL.
CROSSCUP & WEST PHILA.

Single and Double Plate and Hollow Spoke Wheels for Steam Roads. Also, Solid and Open Plate Wheels for Street Roads. Wheels with Turned Threads, under the Patent of "W. W. Lobdell."

GEO. G. LOBDELL, President. **W. W. LOBDELL,** Secretary. **P. N. BRENNAN,** Treasurer.

ALLEN PAPER CAR WHEEL COMPANY,

General Offices: 240 Broadway, N. Y.



MANUFACTURERS OF ALLEN'S PATENT
PAPER CAR WHEEL.
ALL SIZES.

Especially adapted for Sleeping and Drawing-Room Cars, Locomotive and Tender Trucks. Steel Tire with Annular Web—Strongest, Most Durable, and Most Economical Wheel in use. Works at Hudson, N. Y., and at Pullman (near Chicago), Ill.

A. G. DARWIN, President. J. C. BEACH, Treasurer. C. H. ANTES, Secretary.

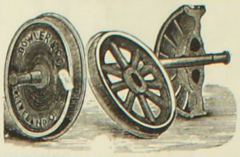
DAVENPORT, FAIRBAIRN & CO.,

ERIE, PA.

MANUFACTURERS OF

CAR WHEELS

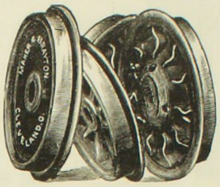
Capacity 350 Wheels per day. Wheels made by improved process. Far more durable than those made in the ordinary way.


BOWLER & CO.
CLEVELAND O.

CLEVELAND FOUNDRY.

Car Wheels of All Kinds and Sizes
WITH OR WITHOUT AXLES.
CHILLED-FACED RAILROAD FROGS.
Street Railroad Turnouts.
ROLLING MILL AND MACHINERY CASTINGS.
Nos. 9, 11 and 13 Winter St., Cleveland, O.
BOWLER & CO.

CLEVELAND WHEEL AND FOUNDRY WORKS,



MAHER & BRAYTON, Proprietors.

MANUFACTURERS OF

CAR, ENGINE, TRUCK AND TENDER WHEELS, RAILROAD, ROLLING-MILL AND MACHINERY CASTINGS, AND STREET RAILROAD WHEELS AND TURNOUTS.

ALSO,

CHILLED-FACED RAILROAD FROGS.

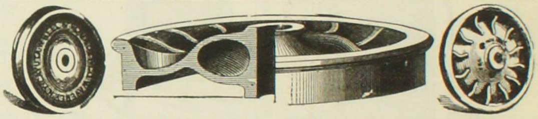
Office: 20 Carter Street.

Works: Cor. Carter and Collins Streets, Cleveland, O.

THE STANDARD STEEL WORKS.

LOCOMOTIVE & CAR WHEEL TIRES.

220 S. FOURTH ST., PHILADELPHIA.



RAMAPO WHEEL AND FOUNDRY COMPANY,

MANUFACTURERS OF

Chilled Wheels for Drawing-Room and Sleeping Coaches, Locomotives, Tenders, Passenger and Freight Cars.

GEO. CHURCH, President and Treasurer. W. W. SNOW, Superintendent and General Manager

RAMAPO, ROCKLAND COUNTY, N. Y.

CHILLED CAR WHEEL GRINDING COMPANY.

Patented in United States and Canada.

H. M. YERRINGTON, President. HARRY HUNTER, Vice-President. C. P. MASON, Secretary and Treasurer.

The GOWAN CHILLED CAR WHEEL GRINDING MACHINE, which we now introduce, is no hasty device. It is the result of four and one-half years' experience, and during that time has received a most thorough test, with satisfactory results.

Railroad officials, upon reflection, will admit it is more essential to have a machine to true up Chilled Car Wheels than a Tire Lathe for turning locomotive tires, for this reason: four or more driving wheel tires are required for one engine; a greater number of Car Wheels compose a train; hence the necessity of this invention.

The great hardness of the chilled tread has hitherto rendered the operation of turning them impracticable, owing to the great expense, which made it cheaper to frequently replace the worn wheels with new ones. To obviate these objections and reduce the cost of this process, we furnish a machine capable of making a perfect wheel at small expense.

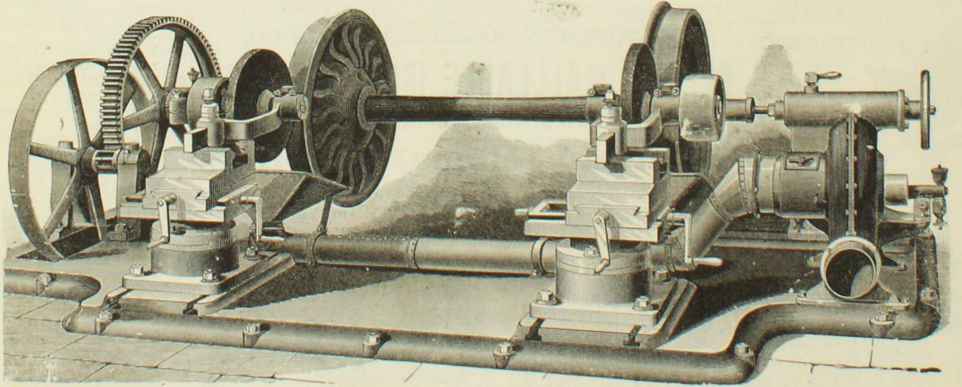
Wheels with flat places, and otherwise badly worn, that are ordinarily condemned and used for scrap iron, can be ground and fitted so as to double their original mileage. This alone makes our machine the greatest money saver ever introduced to railroads.

A sound Chilled Car Wheel trued by our method cannot be excelled by a paper or any other description of Car Wheel with steel tire.

Any person having a slight acquaintance with tools may, after five hours' instruction, become thoroughly competent to operate our machine.

Allowing all new wheels to be 3-32 inch oval, if properly fitted to axles, our machine *will* true up one pair an hour.

We manufacture expressly for use with our machine, Abrading Wheels, which, as the result of a series of experiments and long experience, we guarantee to be the best grinding wheels made. No odor, no glaze, and we defy competition.



CENTRAL PACIFIC RAILROAD,
CHICAGO & NORTHWESTERN RAILWAY,
CHICAGO, ROCK ISLAND & PACIFIC R'WAY,
VIRGINIA & TRUCKEE RAILROAD,
PENNSYLVANIA RAILROAD,
DENVER & RIO GRANDE RAILWAY,
CHICAGO, MILWAUKEE & ST. PAUL RAILROAD,
CANADIAN PACIFIC RAILROAD (YALE B. C.),

UNION PACIFIC RAILWAY (DENVER & SOUTH PARK DIVISION),
SOUTH PACIFIC COAST RAILROAD,
NEVADA COUNTY NARROW GAUGE RAILROAD,
CHICAGO CITY RAILWAY (SOUTH DIVISION),
NEW YORK, ONTARIO & WESTERN RY.,
LEHIGH VALLEY R. R.,
PULLMAN PALACE CAR CO.,

ALLEGHENY VALLEY RAILROAD,
CHICAGO CITY RAILWAY (WEST DIVISION),
CARSON & COLORADO RAILROAD,
LAKE TAHOE NARROW GAUGE RAILROAD,
J. HARRIS & CO., ST. JOHNS, N. B.
BALTIMORE & OHIO R. R.,
NEW YORK, LAKE ERIE & WESTERN

We are prepared to sell machines outright, or to furnish them on royalty for each pair of wheels trued. Address

CHILLED CAR WHEEL GRINDING COMPANY, CARSON NEVADA. (OR 3 GRAND PACIFIC HOTEL CHICAGO, ILL.

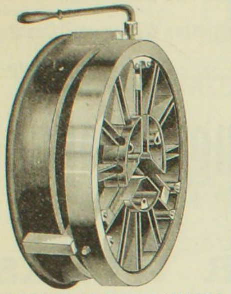
THE E. HORTON & SON CO.,

Windsor Locks, Conn., U. S. A.,

Only Manufacturers of the Universally used

Horton Lathe and Car Wheel Chucks.

☞ The only Chucks made that use the PATENT JAW, with both face and bite of Jaws ground perfectly true. Send for Illustrated Catalogue.



THE HORTON CAR WHEEL CHUCKS.
FROM 30 TO 42 INCHES.

This cut represents the Horton Car Wheel Chuck holding a car wheel in proper position for boring, the flange and tread of the wheel assuming a true position on the jaws.

CHILLED CHARCOAL
C C C W
CAYUTA
WH
CAYUTA WHEEL & FOUNDRY CO. WAVERLY, N.Y.

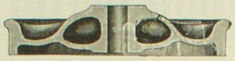
MANUFACTURED BY

CAYUTA WHEEL AND FOUNDRY CO.

WAVERLY, N. Y.

M. LYMAN, Jr., Superintendent and Treasurer

L. H. TAYLOR, Pres. S. P. RABER, Sup't.
J. H. WALKER, Sec. and Treas.



TAYLOR IRON WORKS,

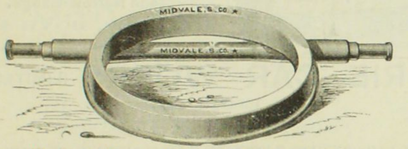
High Bridge, N. J.,

MANUFACTURERS OF

Chilled Iron Car-Wheels, Steel-Tired Wheels, Car and Locomotive Axles and Draw Hooks.

THE MIDVALE STEEL CO.

A. G. TOMPKINS & CO., Boston.
H. A. ROGERS, New York.
W. H. WALLACE & CO., New York.
MANNING, MAXWELL & MOORE, N. Y.
CREAR, ADAMS & CO., Chicago.

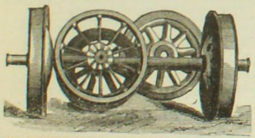


POST & CO., Cincinnati.
W. & A. C. SEMPLE, Louisville.
E. H. LINLEY, St. Louis.
GEO. A. SMITH, Richmond.
GUILFORD SMITH, Buffalo.

Works & Office: Nicetown, Philadelphia, Pa

TIRES AND AXLES OF EVERY DESCRIPTION.

HEAVY CASTINGS AND FORGINGS.



MOWRY CAR WHEEL WORKS,

CINCINNATI, O.

Manufacturers of CAR WHEELS of all descriptions. Wheels and Axles, Chilled Tires; Engine, Car and Bridge Castings, of any pattern, furnished to order at short notice. Wheels of all sizes constantly on hand.

OFFICE: No. 27½ W. Third St., Cincinnati, O.
WORKS: Eastern Avenue and Lewis Street.

L. A. GREEN, Sup't, Cincinnati, O.

UNION FOUNDRY

AND

PULLMAN CAR WHEEL WORKS,

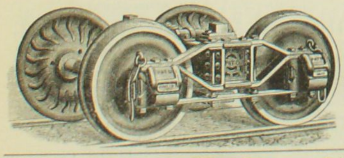
CHICAGO, ILL.

MANUFACTURERS OF

Car and Engine Wheels, Wheels and Axles,

AND ALL CLASSES OF

CASTINGS FOR RAILROAD PURPOSES.



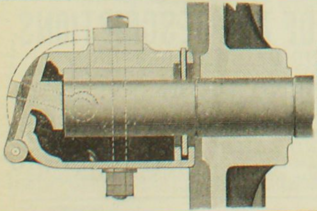
THE THIELSEN TRUCK CO.,

142 Dearborn St.,

CHICAGO, ILL.

We respectfully refer you to the following railroads using this Truck:

R. & D.; K. C., St. J. & C. B.; M. R., F. S. & G.; C., B. & Q.; C., A. & St. L.; A., T. & S. F.; A. & N.; K. P.; F. & P. M.; M. C.; St. L., I. M. & S.; B & M. R. (in Neb.); D. P.; L., L. & G.; C. V.; S. C.; Baldwin Locomotive Works.



RAOUL JOURNAL BOX.

This box is designed to provide an end stop for the axle, and thereby dispense with the shoulder and collar, and at the same time not obstruct the process of packing the box. The journal may be made any desired length and diameter. The life of the axle is doubled. The expense of brasses and lubricants enormously reduced; end wear of brasses and hot-boxes obviated. It is now in successful operation on trucks of engines, tenders, passenger and freight cars. For further information address

RAMAPO WHEEL & FOUNDRY COMPANY
Ramapo, N. Y.;
Columbus Iron Works Company
Columbus, Ga.

Hopkins' Patent Lead-Lined, Self-Fitting Journal Bearings,

AND

Meneely's Patent Bell-Metal Ended Journal Bearings, for Reducing Lateral Wear.

MADE BY

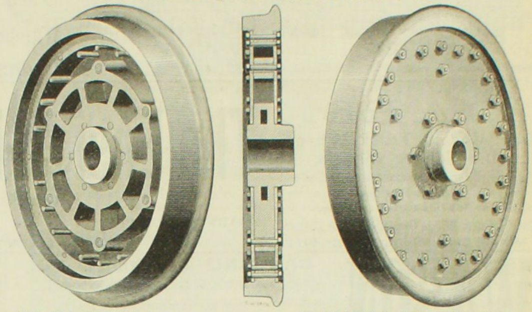
GEO. R. MENEELY & CO., West Troy, N. Y.,
and Atlanta Brass Foundry (A. B. Bostick, Supt.), Atlanta, Ga.

PAIGE CAR WHEEL CO.,

MANUFACTURERS OF

PAIGE'S PATENT WROUGHT METAL WHEELS.

Office, 211 Superior St., Cleveland, O.



J. E. FRENCH, President. W. S. DODGE, Secretary and Treasurer.

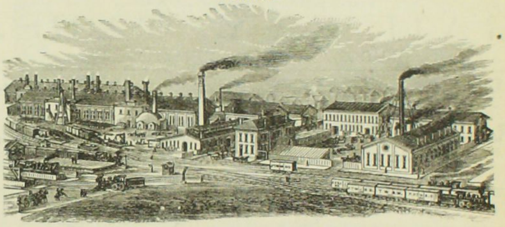
Adapted for Sleeping and Drawing Room Cars, Locomotive and Tender Trucks. Steel Tires with ½ inch Plates, securely bolted, making it a perfectly Safe, Durable and Noiseless Wheel.

ESTABLISHED 1853. INCORPORATED 1873.

BASS FOUNDRY AND MACHINE WORKS.

MANUFACTURERS OF

Steam Engines, Boilers, Heavy Machinery, Car Wheels and Railroad Castings.

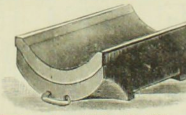


J. H. BASS, President. J. I. WHITE, Secretary. R. J. FISHER, Treasurer.

FORT WAYNE, IND.

THE LEAD AND IRON BEARING.

CHEAP AND PRACTICAL



Patented Jan. 31, 1882.

NO CUT JOURNALS.

Better than Bronze or Brass of any kind.

Strong, Durable, Tough and Pliable

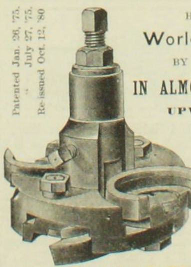
THEY FIT THE JOURNAL AND RUN COOL.

We guarantee our Bearings to give satisfaction in every particular. Send for descriptive circular.

G. J. SHIMER & CO., - - Freemansburg, Pa.

THE SHIMER MATCHING HEADS.

Patented Jan. 26, '75.
" July 27, '75.
Re-issued Oct. 12, '80.



Tongue Head.

HAVE BEEN AWARDED A

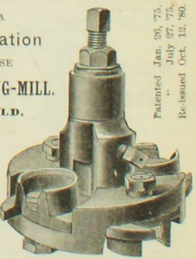
World-Wide Reputation

BY ACTUAL EVERY-DAY USE

IN ALMOST EVERY PLANING-MILL.

UPWARDS OF 9,000 SOLD.

The bits arranged in upper and lower series are secured to seats alternately inclined for the purpose of giving clearance to their cutting points—a feature peculiar to this head and the strong hold of its claim to public favor. Positively the lightest, strongest and most durable matching head in the world. Warranted to work the hardest cross-grained lumber with the greatest ease, and not chip up the edges. Send for descriptive circular,



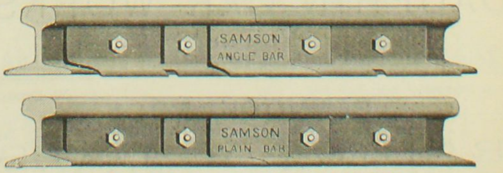
Groove Head.

Patented Jan. 26, '75.
" July 27, '75.
Re-issued Oct. 12, '80.

SHIMER & CO., - - - - MILTON, PA.

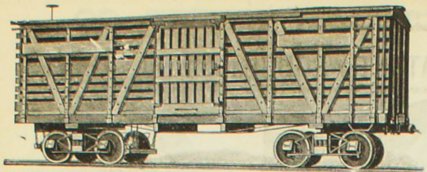
CHICAGO SPLICE BAR MILL.

MORRIS SELLERS & CO., Sole Proprietors and Manufacturers of the Celebrated "SAMSON" BAR



And Every Variety of Plain and Angle Splice Bars.

OFFICE, 6 ASHLAND BLOCK.... ...... Mill, Chicago Ave. and the River...... . CHICAGO



LA FAYETTE CAR WORKS,

LAFAYETTE, IND.

Freight and Caboose Cars of all kinds. Hand and Push Cars.

Warehouse Trucks and Baggage Barrows. Car Wheels and Castings.

B. F. MASTEN, Prest. **C. E. GORE**, Supt.

MANUFACTURERS OF

CARS,

Car Wheels, Truck Wheels and Tender Wheels,

Hammered Car and Locomotive Axles and General Forgings.

Car Wheels Fitted to Axles.

Car Castings, Bridge Castings and Car Brasses.

Mining Cars, Mining Wheels, Etc.

W. H. BARNUM, President, Lime Rock, Conn.
F. E. CANDA, Vice-President, New York City.
E. ENSIGN, Secretary and Treasurer, Huntington, W. Va.

The Ensign Manufacturing Company

(CAR WORKS, FOUNDRIES AND STEAM FORGE).

DAILY CAPACITY, - - - - - - - - - - - - 15 Box Cars, 250 Car Wheels, 80 Axles.

HUNTINGTON WEST VIRGINIA.

WASON

CAR AND FOUNDRY CO.,
CHATTANOOGA, TENN.,
MANUFACTURERS OF
FREIGHT CARS, CAR WHEELS AND CASTINGS OF ALL KINDS.

BRADLEY CAR WORKS, WORCESTER, MASS.

ESTABLISHED 1833.

MANUFACTURERS OF EVERY DESCRIPTION OF

RAILWAY CARS.

OSGOOD BRADLEY, Proprietor.

MIDDLETOWN CAR WORKS,

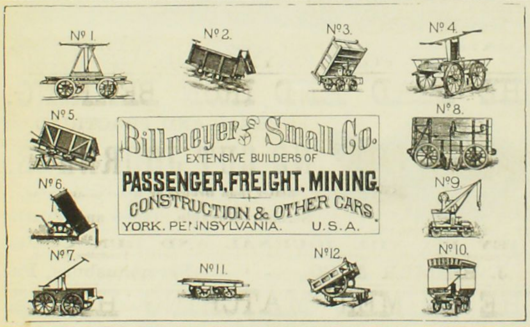
MICHAEL SCHALL & ARTHUR KING, Proprietors,

MANUFACTURERS OF

RAILWAY AND MINE CARS.

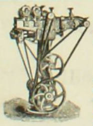
SPECIAL ATTENTION GIVEN TO CAR REPAIRS.

MIDDLETOWN, PA.



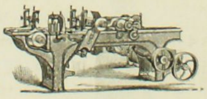
Billmeyer & Small Co.
EXTENSIVE BUILDERS OF
PASSENGER, FREIGHT, MINING, CONSTRUCTION & OTHER CARS
YORK, PENNSYLVANIA. U.S.A.

Nº 1
Nº 2.
Nº 3.
Nº 4.
Nº 5.
Nº 8.
Nº 6.
Nº 9.
Nº 7.
Nº 11.
Nº 12.
Nº 10.



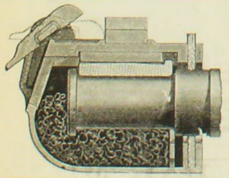
BLIND SHADE
Planing Machine
FOR
CAR WORK.
The most perfect Machine in use.

LEE'S PATENT
Molding Machines



Five different styles and sizes. These are especially adapted to all classes of car work.

HENRY A. LEE Manuf'r 164 Union St., Worcester Mass.



THE HEWITT BOX-LID CO.,

142 DEARBORN ST.,
CHICAGO, ILL.

We respectfully refer you to the following railroads using the Hewitt Cover:
K. C., St. J. & C. B.; M. R., Ft. S. & G.; C., B. & Q.; C., A. & St. L., A., T. & S. F.; A. & N.; K. P.; F. & P. M.; D., L. & N.; D. & B. C.; M. C.; H. & St. J.; C. & V.; St. L., I. M. & S.; B. & M. R. (in Neb.); D. P.; L. L. & G.; L. E. & W.; L., P. & C.; I. C.; O. C.; St. L. V. & T. H.; St. P. & S. C.; N. P.; C. & E. I.; M. P.

MICHAEL SCHALL. S. J. SHOOP.

DAUPHIN CAR WORKS,

DAUPHIN, PA.

Freight, Coal, Dump, and Mine Cars. Capacity six cars per day.

I. N. PENNOCK. W. PENNOCK.

PENNOCK BROS.,

MANUFACTURERS OF

RAILWAY CARS,

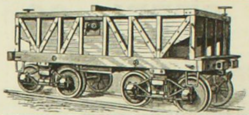
MINERVA, OHIO.

PARDEE CAR WORKS,

WATSONTOWN, PA.

PARDEE, SNYDER & CO. (Limited), Proprietors.

C. W. LEAVITT, Agent, 161 Broadway, Room 2, N. Y.



YOUNGSTOWN CAR WORKS

Railroad Freight Cars, Broad and Narrow-Gauge.

MILLIKEN, BOYD & CO.,
Youngstown, Ohio.

ERIE CAR WORKS (LIMITED).

ERIE, PA.

Capacity 16 Cars Per Day.

FREIGHT CARS OF BEST MATERIAL, AND CONSTRUCTION A SPECIALTY

LITCHFIELD CAR AND MACHINE COMPANY,

LITCHFIELD, ILLINOIS,

Manufacturers of all kinds of Passenger and Freight Equipment, both Wide and Narrow Gauge.

CAR WHEELS A SPECIALTY IN THE MACHINERY DEPARTMENT.

Especial attention is given to furnishing Hoisting Engines, Pit Cars, Dumps, etc., etc., for Coal Mines, as well as building Stationary Engines and Boilers, and General Brass and Sheet-Iron Work.

GEO. C. KIMBALL, President. EDWARD HILL, General Agent. H. PARK, Treasurer.

MUSKEGON CAR AND ENGINE CO.

MUSKEGON, MICHIGAN,

MANUFACTURERS OF

Passenger Coaches, Street Railway Cars, Freight and Logging Cars, Stationary and Marine Engines, Locomotives, Iron and Brass Castings.

Agents for National Tube Works Co. "Mack Injector."

Boilers and Machinery repaired.

HARRISBURG CAR MANUFACTURING CO.

MANUFACTURE

PASSENGER MAIL, BAGGAGE, BOX, GONDOLA, COAL

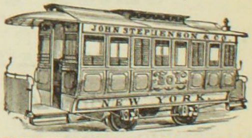
AND ALL OTHER KINDS OF

RAILROAD CARS;

Railroad Car Wheels and Castings, Bridge and Rolling Mill Castings, Bridge Rods, Bolts and

RAILROAD FORGINGS.

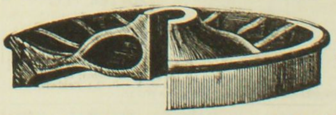
JOHN STEPHENSON CO., Limited,



STREET CARS

And Omnibuses.

47 East Twenty-Seventh St, N. Y.



WASON MANUFACTURING CO.

SPRINGFIELD, MASS.

BUILDERS OF

RAILWAY CARS OF ALL DESCRIPTIONS,

CAR WHEELS AND RAILWAY CASTINGS.

H. S. HYDE, Treasurer. G. C. FISK, President.

THE CANTON CAR COMPANY,

MANUFACTURERS OF

ALL KINDS OF FREIGHT CARS,

CAR, BRIDGE AND RAILROAD CASTINGS,

Capacity, Ten Cars per Day. CANTON, OHIO

Manufacturers of Cordrey's Patent Rotary Dumping Cars, Smith's Imperial Feed Mills, &c.
Repairing of all kinds promptly done.

GEO. KINGSLAND, Prest. F. GILLESPIE, Supt.

CENTRAL UNION BRASS CO.,

MANUFACTURERS OF

BRASS CAR TRIMMINGS,

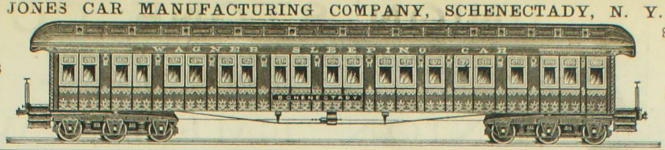
AND ALL KINDS OF

Brass Castings, Bronze, Babbitt Metals, Solder, etc. Brass Journal Bearings a Specialty.

811 North Second St., ST. LOUIS MO.

JONES CAR MANUFACTURING COMPANY, SCHENECTADY, N. Y.

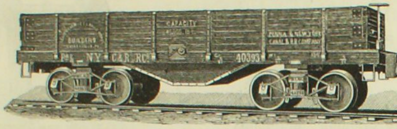
BUILDERS OF
SLEEPING
AND
DRAWING ROOM CARS
AND
PASSENGER COACHES.
WALTER A. JONES, Pres't and Treas.
BENJ. F. MANIER, Superintendent.



STREET RAILWAY CARS
OF ALL VARIETIES,
INCLUDING THE
POPULAR EXCURSION
OR
SUMMER CAR
With all the late improvements.

LEHIGH CAR, WHEEL AND AXLE WORKS,

McKEE, FULLER & CO., Catasauqua, Pa.,



MANUFACTURERS OF
BROAD AND NARROW-GAUGE FREIGHT & COAL CARS
OF EVERY DESCRIPTION.
WHEELS For Freight, Locomotive, Truck, Tender, and Passenger Service, HAMMERED AXLES and other forgings.
Capacity: 20 CARS PER DAY, 300 WHEELS PER DAY.
Wheels Fitted to Axles, and Prices Furnished on Application.

THE HARLAN & HOLLINGSWORTH CO.,

CAR BUILDERS,

WILMINGTON, DEL.

Established in - - - - - - 1836.

CORDESMAN & EGAN CO.,
MANUFACTURERS OF THE
Most Improved and Patented WOOD-WORKING MACHINERY,
Nos. 234 to 250 WEST FRONT STREET, CINCINNATI, O., U. S. A.

VARNISH MAKERS.
PRATT & LAMBERT
PRATT'S LIQUID DRYER. 110 JOHN ST. NEW YORK.

LOWE'S METALLIC PAINT CO.

CHATTANOOGA, TENN.

THIS SHIELD IS PAINTED WITH LOWE'S METALLIC PAINT
TRADE MARK

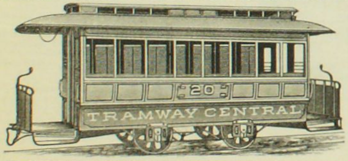
THE BEST PAINT EVER OFFERED TO THE PUBLIC

It is now being sold to **50 Railroad Companies**, several of the largest Car and Wagon Manufactories, Machine Shops, Wrought Iron Bridge Works, Dry Docks, Ship Yards and Tin and Sheet Iron Roofers in the United States and Canada.

SPECIAL LOW RATES OF FREIGHT TO ALL POINTS.

Send for prices containing the best and largest number of certificates ever published of any one article

---

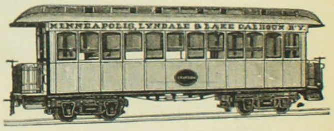


J. G. BRILL & CO.,

PHILADELPHIA

BUILDERS OF

RAILWAY AND TRAMWAY CARS.


MINNEAPOLIS, LYNDALE & LAKE CALHOUN R'Y.

PENINSULAR CAR WORKS,

DETROIT, MICH.

Operating Car Works at Detroit & Adrian, Mich., and Detroit Steam Forge.

Freight Cars of every Description. **Wheels and Castings, Hammered Iron Axles.**

A. HEGEWISCH, President.
C. BENN, Secy. and Treas. New York, N. Y.

W. H. CHADDOCK, Genl. Agt.
C. F. JAURIET, Gen. M. M. Chicago, Ill.

THE UNITED STATES ROLLING STOCK COMPANY,

General Offices, 35 Broadway, N. Y.; Works, Chicago, Ill., and Urbana, Ohio,

Offers for lease to Railroads, Freight Lines, Mining Companies and others, Locomotive Engines, Box, Stock, Gondola, Dump, Flat and Refrigerator Cars,

And is Prepared to Build for LEASE and on Contract for CASH, or under the CAR-TRUST SYSTEM, such ROLLING STOCK as may be Required

---

MICHIGAN CAR COMPANY,

MANUFACTURERS OF
RAILROAD CARS,

JAMES McMILLAN, President.
HUGH McMILLAN, V. Pres. and Gen. Manager.
JAMES McGREGOR, General Superintendent.

H. W. DYAR, Assistant Mana
W. K. ANDERSON Treasurer
JOSEPH TAYLOR, Secretary

Office: Newberry & McMillan Building, Detroit, Mich.

DETROIT CAR WHEEL COMPANY,

Manufacturers of
LOCOMOTIVE AND CAR WHEELS, RAILROAD AND OTHER CASTINGS,
DETROIT, MICH.

JAMES McMILLAN, President.
HUGH McMILLAN, V. Pres. and Gen. Manager.

J. H. WHITING, Superintendent.
W. K. ANDERSON, Secretary and Treasurer.

BAUGH STEAM FORGE COMPANY,

Manufacturers of all Descriptions of
CAR AND DRIVING AXLES, COUPLING LINKS AND PINS, SHAFTINGS, DRAW BARS, ETC.
Works on River Road, Below City,
DETROIT, MICH.

JAMES McMILLAN, President.
HUGH McMILLAN, V. President.
JOHN B. BAUGH, General Manager.

SAMUEL A. BAUGH, Superintendent.
W. K. ANDERSON, Treasurer.
R. D. FIELD, Secretary.

DETROIT IRON FURNACE COMPANY.

LAKE SUPERIOR CHARCOAL PIG IRON,
FOR CAR-WHEEL AND MALLEABLE USE.
DETROIT, MICH.

JAMES McMILLAN, President.
HUGH McMILLAN, Vice-Pres. and Treas.

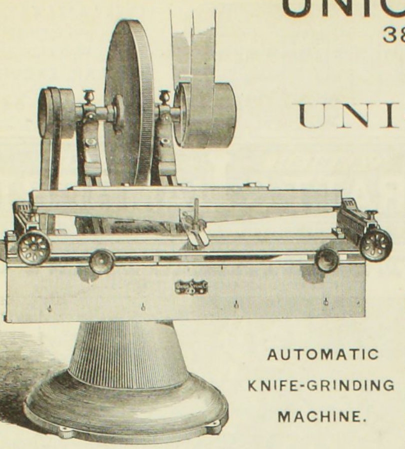
LEE BURT, Manager.
E. C. WETMORE, Secretary

UNION STONE COMPANY,

38 and 40 HAWLEY ST., BOSTON, MASS.,

Patentees and Manufacturers of the

UNION EMERY WHEEL.



AUTOMATIC KNIFE-GRINDING MACHINE.

Emery Wheel Machinery and Tools a Specialty.

Automatic Knife-Grinding Machines.

WOOD-POLISHING WHEELS,

EMERY, QUARTZ, CORUNDUM

GRINDERS' AND POLISHERS' SUPPLIES.

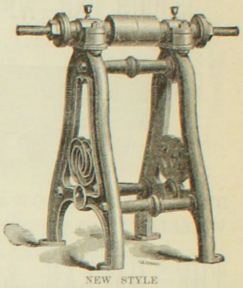
Catalogue on Application.

Union Stone Company's Patent and Improved Automatic Knife-Grinding Machine,

For grinding Planing-Machine Knives, Bookbinders', Curriers' Long Knives and Shears of all kinds. Size, 24, 36, 50, 80, 100 and 120 inches.

The Grinding Wheel is 26 inches in diameter and 1½ inches thick, with Patent Sliding Boxes, so that the wheel can be entirely used up.

This machine soon pays for itself in the labor it saves. It will grind a knife in less time than on a grindstone, and with a perfectly straight edge, in itself a sufficient reason for purchasing the machine, to say nothing of the economy.



NEW STYLE
WOOD WHEEL POLISHING MACHINE.

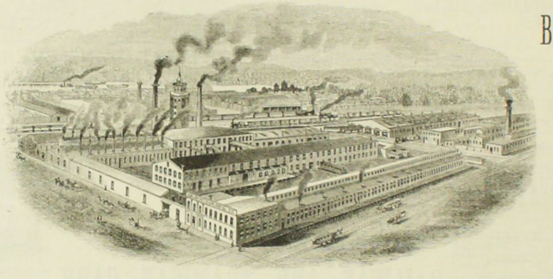
GILBERT CAR MANUFACTURING COMPANY, TROY, N. Y.

URI GILBERT, Prest. and Treas. B. E. RICKER, General Manager. WM. E. GILBERT, Secretary. EDWARD G. GILBERT, Vice Prest. and Asst. Treasurer.

MANUFACTURERS OF
ALL KINDS AND SIZES OF
Steam and Street
RAIL WAY CARS

—:—

—ESTABLISHED 1820.—



Building, Dissecting and Packing Cars for Export a Specialty.

—:—

—INCORPORATED 1879.—

POST & COMPANY

STILL AHEAD!

AWARDS OF NATIONAL EXPOSITION OF RAILWAY APPLIANCES,

HELD AT CHICAGO, MAY 24, 1883.

GOLD MEDAL—FIRST PREMIUM—**For Best Display of Interior Furnishings for Passenger Cars,** including new styles of Lamps, Locks, Racks, etc., etc.

GOLD MEDAL—FIRST PREMIUM—**For Best Locomotive Head-Light, for Burning Oil.** With Danger and Number Signals attached.

SILVER MEDAL—FIRST PREMIUM—**For Best Basket Rack, for Passenger Cars.** New Design, Solid Round Corners.

BRONZE MEDAL—FIRST PREMIUM—**For Best Passenger Car Door Lock.** Embodying Special New Features in Fastening the Knobs.

BRONZE MEDAL—FIRST PREMIUM—**For Best Switch Lock.** Tumblers so arranged that it is impossible to spring it open; they must be released with proper key.

We are just getting out new styles and designs of **INTERIOR FURNISHINGS** for Passenger Cars, including Lamps, Locks, Racks, etc., etc.

Special attention called to our **NEW PERFECTION HEAD-LIGHT.**

Send for Illustrated Catalogue and special quotations.

POST & COMPANY, Cincinnati, Ohio, U. S. A.

MINERAL WOOL

As a filling for floors of passenger cars, this material prevents the loss of heat, deadens the sound and lowers the center of gravity of the car. More effective than shavings of double the thickness, and entirely fireproof. Valuable also for covering all heated surfaces. Only $6 per 100 sq. feet, filling 3 inches thick. Sample and circular free by mail.

U. S. Mineral Wool Co.,
16 CORTLANDT ST., NEW YORK.

Index to Advertisements in the National Car-Builder.

PAGE.

Air Brakes:
Eames Vacuum Air Brake Co., Watertown, N. Y. v
The American Brake Co., St. Louis, Mo. xxiv
Westinghouse Air Brake Co., Pittsburgh, Pa. (cover) 1

Axles:
Baugh Steam Forge Co., Detroit, Mich. xi
Lake Erie Iron Co., Cleveland, O. xxvi
Lang, W. Baily, New York and Boston. iv
Midvale Steel Co., Philadelphia, Pa. ix
New Albany Steam Forge, New Albany, Ind. xxvi
Pittsburgh Forge & Iron Co., Pittsburgh, Pa. i
Wilson, Walker & Co. (Limited), Pittsburgh, Pa. xx

Bell Cord and Couplings:
Wellington, Henry W., Boston, Mass. vii

Boiler Testing Apparatus:
Rue Manufacturing Co., Philadelphia, Pa. xvii

Boiler Plate:
Phillips, Nimick & Co., Pittsburgh, Pa. xxvi
Shoenberger & Co., Pittsburgh, Pa. xvii

Bolts:
Buffalo Nut & Bolt Co., Buffalo, N. Y. xv
Plumb, Burdict & Barnard, Buffalo, N. Y. (cover) 4
Smith, J. Noyes & Co., Cleveland, Ohio. xxiv

Bolt Cutters:
Howard Iron Works, Buffalo, N. Y. xvii

Brass and Copper:
Ansonia Brass & Copper Co., New York, N. Y. xvii

Cars:
Billmeyer & Small Co., York, Pa. x
Bradley Car Works, Worcester, Mass. x
Brill, J. G. & Co., Philadelphia, Pa. xi
Bucyrus Foundry & Mfg. Co., Bucyrus, O. vi
Canton Car Co., Canton, O. x
Dauphin Car Works, Duphin, Pa. x
Ensign Manufacturing Co., Huntington, W. Va. x
Erie Car Works (Limited), Erie, Pa. x
Gilbert Car Mfg. Co., Troy, N. Y. xii
Gill Car Manufacturing Co., Columbus, O. (cover) 1
Harlan & Hollingsworth Co., Wilmington, Del. xi
Harrisburg Car Mfg. Co., Harrisburg, Pa. x
Jones Car Manfg. Co., Schenectady, N. Y. xi
Lafayette Car Works, Lafayette, Ind. x
Lehigh Car, Wheel and Axle Works, Catasauqua, Pa. xi
Litchfield Car and Machine Co., Litchfield, Ill. x
Michigan Car Co., Detroit, Mich. xi
Middletown Car Works, Middletown, Pa. x
Milliken, Boyd & Co., Youngstown, Ohi x
Muskegon Car & Engine Co., Muskegon, x
North Carolina Car Co., Raleigh, N. C. iv
Pardee Car Works (limited), Watsontown, x
Peninsular Car Works, Detroit, Mich. xi
Pennock Bros., Minerva, Ohio. x
Stephenson, The John Co. (Limited), New York, N. Y. x
U. S. Car Company, Boston, Mass. xxvi
U. S. Rolling Stock Co., New York, N. Y. xi
Wason Car & Foundry Co., Chattanooga, Tenn. x
Wason Manufacturing Co., Springfield, Mass. x

Car Brake Shoes:
Congdon Brake Shoe Co., Chicago, Ill. iv
Standard Brake Shoe Co., Ft. Wayne, Ind. iv

Car Couplings:
Cowell Platform & Coupling Co., Cleveland, O. iii
McConway, Torley & Co., Pittsburgh, Pa. iv
Perry's Safety Car Coupling, Chicago, Ill. xxiv

Car Hardware:
Central Union Brass Co., St. Louis, Mo. x
Post & Co., Cincinnati, O. xii
Union Brass Manufacturing Co., Chicago, Ill. ii

Car Heaters:
Union Brass Manufacturing Co., Chicago, Ill. ii
Winslow Car Stove Co., Cleveland, Ohio. v

Car Pushers:
Dwight, E. P., 407 Library st., Phila, Pa. iv
Penfield Block Co., Lockport, N. Y. (cover) 2

Car Roofing:
Empire Car Roofing Co., Chicago, Ill. (cover) 1
Taylor, N. & G. Co., Philadelphia, Pa. (cover) 2

Car Seats:
Buntin, Geo. & Co., Philadelphia, Pa. (cover) 1
Gardner & Co., New York, N. Y. —
Hale & Kilburn Mfg. Co., Phila., Pa. v
Mason, C. C., Altoona, Pa. xxvi
Union Brass Manufacturing Co., Chicago, Ill. ii
Wakefield Rattan Co., Boston, Mass. xxvi

Car Springs:
Andrews & Clooney, New York, N. Y. (cover) 3
Cliff & Righter Co., New York, N. Y. (cover) 1
Davis, A. B., Car Spring Co. (Limited), Philadelphia, Pa. (cover) 3
Diamond State Car Spring Works, Wilmington, Del. (cover) 3
Detroit Car Spring Co., Detroit, Mich. (cover) 3
French, A. & Co., "Elliptic," Pittsburgh, Pa. 1
French Spiral Spring Co., Pittsburgh, Pa. (cover) 2
Jeffries, J. & Son, Philadelphia, Pa. (cover) 3
Keystone Car Spring Works, Philadelphia, Pa. xviii
National Car Spring Co., New York, N. Y. (cover 1) and page xx
Pickering, C. W. & Co., Philadelphia, Pa. (cover) 3
U. S. Concave Spring Co., New York, N. Y. (cover) 3

Car Trucks:
Thielsen Truck Co., Chicago, Ill. ix

Car Truck Channels:
Kloman, Andrew, Pittsburgh, Pa. (cover) 1

Car Wheels:
Allen Paper Car-Wheel Co., New York, N. Y. viii
Bass Foundry & Machine Works, Ft. Wayne, Ind. ix
Bowler & Co., Cleveland, O. viii
Cayuta Wheel & Foundry Co., Waverly, N. Y. ix
Davenport, Fairbairn & Co., Erie, Pa. viii
Detroit Car Wheel Co., Detroit, Mich. xi
Ellis, W. R., New York & Boston (cover) 4
Ensign Manufacturing Co., Huntington, W. Va. x
Gill Car Manufacturing Co., Columbus, O. (cover) 1
Griffin Car Wheel Co., Detroit, Mich. (covers) 1 and 4
Griffin, Thomas F. & Sons, Buffalo, N. Y. (covers) 1 and 4
Griffin & Wells Foundry Co., Chi., Ill. (covers) 1 and 4
Lehigh Car, Whl & Axle Wks, Catasauqua, Pa. xi
Lobdell Car-Wheel Co., Wilmington, Del. viii
Maher & Brayton, Cleveland, O. viii
Mowry Car Wheel Works, Cincinnati, O. ix
Paige Car Wheel Co., Cleveland, Ohio. ix
Ramapo Wheel & Foundry Co., Ramapo, N. Y. viii
Taylor Iron Works, High Bridge, N. J. ix
Thacher & Co., Geo. H., Albany, N. Y. xiv
Union Foundry & Pullman Car Wheel Works, Chicago, Ill. ix
Wason Manufacturing Co., Springfield, Mass. x
Whitney, A. & Sons, Philadelphia, Pa. viii

Car Window Balance:
Gardner, O. K., Pittsburgh, Pa. iv

Chains:
Union Chain Works, Pittsburgh, Pa. xxiv

Chilled Car-Wheel Grinding Co:
Carson, Nev., Chicago, Ill. viii

Chucks:
Horton, The E. & Son Co., Windsor Locks, Conn. ix

Challenge Coach Grease:
Calhoun, W. S. & Co., Chicago, Ill. v

Curled Hair and Glue:
Baeder, Adamson & Co., New York, N. Y. (cover) 4

Deflectors:
Globe Ventilator Co., Troy, N. Y. xxv

Draughtsman's Materials:
Ketcham, Chas. F. & Co., New York, N. Y. iv
McAllister, W. Mitchell, Philadelphia, Pa. xxvi

Draw-Bars:
Pittsburgh Forge & Iron Co., Pittsburgh, Pa. i
Safford, J. B., Buffalo, N. Y. xxiv
Wilson, Walker & Co., Pittsburgh, Pa. (limited) xx

Emery:
Page, Henry A., Boston, Mass. —

Emery Wheels:
Diamond Emery Wheel and Machine Co., Providence, R. I. (cover) 4
Union Stone Co., Boston, Mass. xii

Engines:
Harris, Wm. A., Providence, R. I. xxiv
Muskegon Car & Engine Co., Muskegon, Mich. x
Westinghouse Machine Co., Pittsburg, Pa. (cover) 1 and 2

Excavators:
Industrial Works, Bay City, Mich. xxviii
Bucyrus Foundry & Mfg. Co., Bucyrus, O. vi

Exhaust Fan:
Huyett & Smith Mfg. Co., Detroit, Mich. (cover) 3

Fire-Box Steel:
Shoenberger & Co., Pittsburgh, Pa. xvii

Flexible Shafts:
Stow Flexible Shaft Co., Limited, Phila., Pa. vi

Forges:
Empire Portable Forge, Cohoes, N. Y. vii
Keystone Portable Forge Co., Philadelphia, Pa. iv

Frogs & Crossings:
Elliot, H. & H., East St. Louis, Ill. vi
Union Switch & Signal Co., Pittsburgh, Pa. (cover) 1

Hand-Car:
Jeffrey's R. R. Velocipede, Chicago, Ill. (cover) 2
Sheffield Velocipede, Peabody, H. W., & Co., Boston, Mass. xxv

Hoisting Engines and Boilers:
Lidgerwood Mfg. Co., New York, N. Y. xxiv

Hydraulic Jacks:
Dudgeon, R., New York, N. Y. (cover) 4

Injectors:
The Hancock Inspirator Co., Boston, Mass. xvii
Rue Manufacturing Co., Philadelphia, Pa. xvii
Sellers, Wm. & Co., Philadelphia, Pa. vii and xxiv

Interlocking Switches:
Union Switch & Signal Co., Pittsburgh, Pa. (cov.) 1

Journal Bearings:
Ajax Metal Co., Philadelphia, Pa. xxvii
Central Union Brass Co., St. Louis, Mo. x
Bostwick, Wm. S. & Co., Pittsburgh, Pa. xxvi
Fitzsimmons, J., Pittsburgh, Pa. iv
Hopkins, D. A., 113 Liberty st., New York, N. Y. xx
Hooks Smelting Co., Philadelphia, Pa. v
Leroy Journal Bearing Co., New York (cover) 2
Meneely, George R. & Co., W. Troy, N. Y. ix
Phosphor-Bronze Smelting Co. (Limited), Philadelphia, Pa. xvii
Ryan, J. J. & Co., Chicago, Ill. vii
Shimer, G. J. & Co., Freemansburg, Pa. ix

Journal Box:
Ramapo Wheel & Foundry Co., Ramapo, N. Y. ix

Journal Box Lids:
Hewitt Box Lid Cover Co., Chicago, Ill. x

Leather:
Yandell, C. R. & Co., New York, N. Y. (cover) 1

Lighting Cars:
Pintsch Lighting Co., New York, N. Y. iv

Lifting Jack:
De Weese, F. M., Chillicothe, Ohio. xvii
Joyce, Cridland & Co., Dayton, O. xxiv

Linseed Oil:
Dean, J. A. & Co., New York, N. Y. xx

Locomotives:
Baldwin Loco. Works, Philadelphia, Pa. xvi
Brooks Loco. Works, Dunkirk, N. Y. xvi
Dickson Manuf'g Co., Scranton, Penn. xvii
Hinkley Locomotive Co., Boston, Mass. xvi
Manchester Loco. Works, Manchester, N. H. xvi
Pittsburgh Loco. & Car W'ks., Pittsburgh, Pa. xvi
Porter, H. K. & Co., Pittsburgh, Pa. xvi
Rhode Island Loco. Wks., Providence, R. I. xvi
Rogers Loco. & Mach. W'ks, Paterson, N. J. xvi
Schenectady Locomotive Works, N. Y. xvi
Virginia Iron Works, Norfolk, Va. xvi

Lubricants:
Calhoun, W. S., Chicago, Ill. v
Goddard, E. A., New York, N. Y. vi
Inland Oil Co., Cincinnati, O. xx
Noyes Manuf'g Co., Boston, Mass. xxiv
Smith, E. A. & Co., Pittsburgh, Pa. vi
Urquhart, John S., New York, N. Y. xxviii

Lumber:
Genet & Silver, New York, N. Y. iii
Millener, Joel H., Buffalo, N. Y. iv
Nashville Lumber Co., Nashville, Tenn. (cover) 3
Smith, W. H. H. & Co., Toledo, Ohio. vii
Vanderbilt & Hopkins, New York, N. Y. vii

Lumber Dryer:
Curran & Wolff, Chicago, Ill. iii

Machinists Tools:
Bement, Wm. B. & Son, Philadelphia, Pa. vi
Betts Machine Co., Wilmington, Del. vi
Bickford, H., Cincinnati, Ohio. (cover) 4
Brown & Sharp Mfg. Co., Providence, R. I. vi
Fitchburg Machine Wks., Fitchburg, Mass. xxviii
Flanders, L. B., Machine Works (Pedrick & Ayer), Philadelphia, Pa. xvii
Forsaith, S. C. & Co., Manchester, N. H. vi
Hilles & Jones, Wilmington, Del. xxiv
Machine Tool Works, Philadelphia, Pa. xxiv
Niles Tool Works, Hamilton, O. (cover) 4
The Pratt & Whitney Co., Hartford, Conn. xxviii
Sellers, Wm. & Co., Philadelphia, Pa. vii
Stowe Flex. Shaft Co. (limited), Phila'phia, Pa. vi

Mahogany, Fancy Woods & Veneers:
Albro Co., The E. D., Cincinnati, O. xviii
Graham, John R., New York, N. Y. iv
Palmer, Parker & Co., Boston, Mass. (cover) 1
Rayner, J., New York, N. Y. xiv
Read, Geo. W. & Co., 180 Lewis st., New York, i

Malleable Iron Castings:
Troy Malleable Iron Co., Troy, N. Y. (cover) 1
Wilmington Malleable Iron Co., Wilmington, Del. vii

Matching Heads:
Shimer & Co., Milton, Pa. ix

Mineral Wool:
U. S. Mineral Wool, New York, N. Y. xiii

Nails:
American Wire Nail Co., Covington, Ky (cover) 1

Nuts:
Empire Nut Co., Pittsburgh, Pa. iv
Smith, J. Noyes, Cleveland, Ohio. xxiv

Oils:
Galena Oil Works (Limited), Franklin, Pa. vii
Inland Oil Co., Cincinnati, O. xx
Signal Oil Works, Franklin, Pa. vii

Oil-Box Covers:
Courtenay & Trull, New York, N. Y. iv
Vulcanized Fibre Co., Wilmington, Del. iv

Paints:
Billings, Taylor & Co., Cleveland, O. xv
Cary Ogden & Parker, Chicago, Ill. xiv
Devoe, F. W. & Co., New York, N. Y. xiv
Iron Clad Paint Co., Cleveland, O. (cover) 2
The Jewett White Lead Co., New York, N. Y. xx
Lowe's Metallic Paint Co., Chattanooga, Tenn. xi
Masury, John W. & Son, New York, N. Y. xv
National Paint Works, Williamsport, Pa. vi
Prince Mfg. Co., New York, N. Y. (cover) 2

Pig Iron:
Detroit Iron Furnace Co., Detroit, Mich. xi

Platform and Couplings:
Cowell Platform Coupling Co., Cleveland, O. iii

Portable Drills:
Stowe Flexible Shaft Co. (Limited), Phila., Pa. vi

Power Hammers:
Bradley & Co., Syracuse, N. Y. xv
Forsaith, S. C. & Co., Manchester, N. H. xvii
Long & Allstatter Co., Hamilton, O. vii

Power Punches, Shears and Hammers:
Colton, G. D. & Co., Galesburg, Ill. vii
Hilles & Jones, Wilmington, Del. xxiv
The Long & Allstatter Co., Hamilton, O. vii

Pumps:
Gordon & Maxwell Mfg. Co., Hamilton, O. vii
Harris, W. A., Providence, R. I. xxiv
Hooker & Colville Steam Pump Co., St. Louis, Mo. vii
McGowan, John H. Co., Cincinnati, O. (cover) 2
Smith, Vaile & Co., Dayton, O. iv
Worthington, H. R., New York, N. Y. (cover) 2

Railways:
C., C., C. & I. R. R. v

Railway Supplies:
Cochnower, Geo. F. & Co., Boston, Mass. (cover) 4
Ellis, W. R., New York and Boston (cover) 4
Leach, H. L., Boston, Mass. vii
Post & Co., Cincinnati, Ohio. vii and xii
Union Brass Co., Chicago, Ill. ii

Railway Car and Locomotive Forgings:
Pittsburgh Forge & Iron Co., Pittsburgh, Pa. i
Wilson, Walker & Co., Pittsburgh, Pa. (limited) xx

Railway Equipment:
Patten, Jas. T., New York, N. Y. xv

Railway Fastenings:
Sellers, Morris & Co., Chicago, Ill. ix

Railway Signals:
Hall's R. R. Signal Co. (cover) 1

Ratchet Drill:
Feithousen, E. G., Buffalo, N. Y. iv

Roofing:
New York Coal Tar Chemical Co. xv
Taylor, N. & G., Philadelphia, Pa. (cover) 2

Safety-Nut:
Atwood Safety-Nut Co., Springfield, Mass. iv

Safety Valves:
Ashton Valve Co., Boston, Mass. xxviii

Sand Paper and Emery Cloth:
Baeder, Adamson & Co., New York, N. Y. (cover) 4

Sash Balances—"Anderson's:"
Gardner, O. K., Pittsburgh, Pa. iv

Saw Setting Machines:
Goodell & Waters, Philadelphia. xxii

Scrap Iron Dealers:
Purves, A. & Son, Philadelphia, Pa. (cover) 2

Sheet-Iron:
Thomson, A. A. & Co., New York, N. Y. xvii
Wood, W. D. & Co., Pittsburgh, Pa. xvii

Sligo Stay-Bolt Iron:
Phillips, Nimick & Co., Pittsburgh, Pa. xxvi

Stand Pipes for Water Stations:
Poage, John N., Cincinnati, Ohio. vi

Steel:
Chrome Steel Works, Brooklyn, N. Y. (cover) 1
Cleveland Crucible Steel Co., Cleveland, O. xxvi
Detroit Steel Works, Detroit, Mich. (cover) 3
Jones, B. M. & Co. (Mushet), Boston, Mass. xiv
Midvale Steel Co., Philadelphia, Pa. ix
Standard Steel Works, Philadelphia, Pa. viii

Steel Castings:
Chester Steel Castings Co., Philadelphia, Pa. vi
Eureka Cast-Steel Co., Philadelphia, Pa. vii

Steel Tires:
Jones, B. M. & Co., Boston, Mass. xiv
Midvale Steel Co., Philadelphia, Pa. ix
Standard Steel Works, Philadelphia, Pa. viii

Switch Stands:
Union Switch & Signal Co., Pittsburgh, Pa. (cover) 1

Switches:
Union Switch & Signal Co., Pittsburgh, Pa. (cover) 1

Tackle Blocks, Trucks and Baggage Barrows:
Penfield Block Co., Lockport, N. Y. (cover) 2

Tank Valves:
Poage, John N., Cincinnati, Ohio. vi

Taps and Dies:
The Pratt & Whitney Co., Hartford, Conn. xxviii

Twist Drills:
Cleveland Twist Drill Co., Cleveland, Ohio. v
Morse Twist Drill and Machine Co., New Bedford, Mass. iv

Varnishes:
Babcock, John & Co., Boston, Mass. xiv
Berry Brothers, Detroit, Mich. xviii
Bigelow, Moses & Co., Newark, N. J. xiv
Billings, Taylor & Co., Cleveland, O. xv
Brooks, Clarence & Co., New York. xv
Devoe, F. W. & Co., New York, N. Y. xiv
Masury, John W. & Son, New York, N. Y. xv
Parrott Varnish Co., Bridgeport, Conn. (cover) 4
Pratt & Lambert, New York, N. Y. xi
Shipman & Bolen, Newark, N. J. xv
Thresher & Co., Dayton, Ohio. (cover) 1
Valentine & Co., New York, N. Y. xiv

Ventilators:
Globe Ventilator Co., Troy, N. Y. xxv

Ventilators for Water Closets:
Bell, E. Y., New York, N. Y. xiii

Vise:
Eagle Anvil Works, Trenton, N. J. iv

Waste (Cotton Seed Hulls):
National R'y Patent Waste Co., New York. xxiv

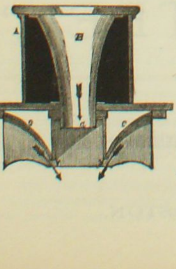
Water Columns:
Poage, John N., Cincinnati, Ohio. vi

Water Supply:
Eclipse Wind Engine Co., Beloit, Wis. vii

Weather Strips:
Patent Metallic Weather Strip Co., New York, N. Y. (cover) 1

White Lead:
The Jewett White Lead Co., New York, N. Y. xx
Lewis, J. T. & Bros., Philadelphia, Pa. vii

Wood-Working Machinery:
Cordesman & Egan Co., Cincinnati, O. xi
Fay, J. A. & Co., Cincinnati, O. xv
Forsaith, S. C. & Co., Manchester, N. H. —
Goodell & Waters, Philadelphia, Pa. xxii
Hoyt & Bros. Manuf'g Co., Aurora, Ill. xxviii
Lee, H. A., Worcester, Mass. x
Rix, A. W., Lebanon, N. H. vii
Rogers, C. B. & Co., Norwich, Conn. xxviii
Rollstone Machine Co., Fitchburg, Mass. vi
Witherby, Rugg & Richardson, Worcester, Mass. (cover) 4
Woods, S. A., Mach. Co., New York, N. Y. vi



BELL'S IMPROVED CLOSET VENTILATOR FOR RAILWAY CARS.

EFFECTUALLY PREVENTS THE UPWARD DRAFT IN THE HOPPER AND PURIFIES THE AIR.

The traveler may enjoy the longest journey without peril to health and life.

THE NATIONAL EXPOSITION OF RAILWAY APPLIANCES AT CHICAGO, JUNE 28, 1883, AWARDED THE HIGHEST PRIZE MEDAL TO THIS VENTILATOR.

The Pennsylvania Railroad Company, July 5, 1883, adopted the same on its entire lines. By permission, refer to that company, and the Master Car-Builder of the Erie road, and also to N. M. Wheeler, Ass't Supt. of the New York Central Sleeping Car Company, as to its signal and practical merits.

Ventilator is placed under floor of the car without alteration. The motion of the train in either direction causes the air to pass downward through the forward funnel c, creating a vacuum at the base of the pipe a, thus securing a downward current through the basin pipe B.

T. E. Sickels, Consulting Engineer of the Union Pacific Railway, after testing the device from New York to Omaha, says: "Your Ventilator accomplishes all that you claim for it."

Railroads desiring licenses, etc., address

E. Y. BELL, 50 Exchange Place New York.

F. W. DEVOE & CO.,

Cor. Fulton and William Streets, - - - - NEW YORK,

MANUFACTURERS OF

DRY COLORS, COACH AND CAR COLORS IN OIL AND JAPAN.

Special Colors Compounded to Match any Desired Shade.

FINE RAILWAY VARNISHES AND JAPANS FOR PASSENGER COACHES.

Also Freight Car, Caboose and Bridge Paints Ready for Use. Fine Brushes for Railroad Car and Coach Painting. All Kinds of Painters' Supplies and Artists' Materials.

Mixed Paints—A Large Assortment of Desirable Shades for Inside and Outside Work.

To insure Durability, Uniformity and Economy Railroad Companies will save themselves great trouble in painting by allowing F. W. Devoe & Co. to prepare their Passenger and Freight Car Colors, as they manufacture from the crude materials, which are the component parts of any shade, and therefore understand better their chemical relationship, when in combination, than can be possible to those who simply buy their dry materials and then grind them. SEND FOR CATALOGUES AND LISTS OF SAMPLE COLORS.

MANUFACTURERS OF
RAILWAY CAR
VARNISHES.

JOHN BABCOCK & Co

NO. 2
LIBERTY SQUARE
BOSTON, MASS.

ESTABLISHED 1832.

FINE COACH AND CAR

VARNISHES

"THE STANDARD FOR QUALITY"

VALENTINE & COMPANY,

MAKERS OF

TRADE **VALENTINES VARNISHES** MARK.

NEW-YORK.

245 BROADWAY.

INCORPORATED 1882.

BRANCHES:
CHICAGO, ILL.,
68 Lake Street.
BOSTON, MASS.,
153 Milk Street.
PARIS, FRANCE,
91 Champs Elysees.

J. RAYNER.

IMPORTER OF AND DEALER IN

VENEERS, MAHOGANY, CABINET WOODS.

STEAM, BAND AND VENEER SAW MILLS.

Foot Houston st., E. R., N. Y.

RAILWAY
VARNISHES.

MOSES BIGELOW & CO

EST. 1845

NEWARK, N. J.

FINEST

DRY & COACH COLORS,

TRUCK AND ROOF SHADES.

CARY, OGDEN & PARKER

MANUFACTURERS,
CHICAGO.

STATION COLORS.

PARKER'S CEMENT PAINT

ALL GOODS GUARANTEED IN QUALITY.

Established 1852.

GEO. H.
THACHER
& CO.

Albany Car-Wheel Works.

CAR WHEELS
AND
Engine Wheels.

Albany, N. Y.

MANUFACTURED
FROM
The Best Brands
OF
CHARCOAL IRON
ONLY.

BOUND VOLUMES OF THE NATIONAL CAR-BUILDER

For 1880, 1881 and 1882.

Price, - - - $3 00 each.

"R. MUSHET'S SPECIAL STEEL."

REQUIRING NO HARDENING.

Saves Wages by Quick Speeds, Heavy Cuts and Few Grindings,

And is at least five or six times as durable as the best cast steel that can be made.

"TAYLOR"

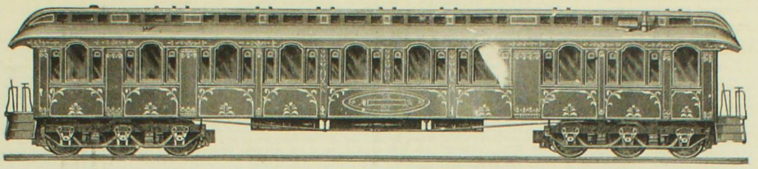
Crucible Cast Steel Locomotive Tyres, Best Yorkshire Bar Iron for Stay Bolts and Locomotive Parts, Best Yorkshire Iron Boiler Plates.

B. M. JONES & CO.,

SOLE REPRESENTATIVES IN THE UNITED STATES,

11 and 13 OLIVER STREET, - - - - - - - - - BOSTON.

THE NATIONAL CAR-BUILDER.



DEVOTED TO THE INTERESTS OF RAILWAY ROLLING STOCK.

VOLUME XIV }
NUMBER 8. }

AUGUST, 1883.

{ SINGLE NUMBERS, TEN CENTS.
{ $1.00 PER ANNUM.

Miscellaneous Items.

THE shops of the New York, Pennsylvania & Ohio road, at Galion, O., are being enlarged, and the C. C. C. & I. road is also making extensive improvements in its track yards at the same place.

THE Philadelphia & Reading R. R. Co. is increasing the capacity of its shops at Reading, Pa. A new blacksmith shop, 300 feet long, is in course of construction, and other improvements are in progress.

THE Barney & Smith Manufacturing Co., Dayton, O., is building passenger train cars of almost every kind for a large number of roads, and is also full of orders in its freight department. The company reports the outlook for car-building as very promising.

CHICAGO has twenty miles of cable railroad, with 174 cars, and the steam engines do the work of 1,970 horses. The running time between the court-house and the city limits, a distance of four miles, is twenty-five minutes less than when horses were used.

IT is said that plans have been completed by the Union Passenger Railway Co., of Philadelphia, for the construction of a cable road in that city, to be completed before next winter. The road will be built in sections, so that only a small portion of the street will be torn up at a time.

"THE Roadmaster Association of America" was organized at Chicago, June 13. Sixty roadmasters were present. Officers were chosen, rules and by-laws adopted, and subjects designated for consideration at the next meeting of the association, which will be held at St. Paul, Minn., on the 12th of September, 1883.

PRESIDENT VILLARD promises that the last spike in the Northern Pacific Railway shall be driven before the 1st of September. The occasion will be an important one. The spike will be of gold and the sledge of solid silver. Mr. Villard will himself drive home the spike, and retain spike and sledge as mementos of the event.

THE all-rail line between St. John, N. B., and Boston is to have a continuous steel track. Four new and elegant passenger coaches have recently been added to the car equipment of the New Brunswick Railway. Two of them were built in Canada, and two by the Wason Company. The fast express trains of the line have cars with Horton reclining chairs.

EXTENSIVE works are being erected by the Roanoke Machine Co., on the line of the Norfolk & Western road, at Roanoke, Va., designed for the building of cars and locomotives. The works will employ 1,000 men. Other enterprises are in progress at this point, involving a large outlay of capital for the development of the manufacture of pig iron at a less cost than in the Pennsylvania iron regions.

THE Central Support Car Truck Co. exhibited two cars at the Chicago Exposition. One was a Missouri Pacific grain car, weighing 32,300 pounds, and having a carrying capacity of 35 tons. The other was a coal car, weighing 22,750 pounds with a carrying capacity of 30 tons. This last-named car is ten years old, and has been in service on the St. Louis, Iron Mountain & Southern road.

MALLEABLE IRON CASTINGS are merely iron castings treated by an annealing process to make them malleable. Less than five years ago one could count upon his fingers all the establishments in this country making malleable iron castings. Now they have multiplied, not only in number, but in capacity, far beyond the ratio of the increase of general iron manufactures. These castings have been improved about 100 per cent. in quality, and at the same time made lower in price.

QUITE gorgeous railroad cars are running between Paris and Bucharest. They are carpeted with Smyrna rugs two inches thick, and the sides of the compartments are covered partly with embossed Japanese leather paper and partly with Gobelin tapestry. The dining-room cars are supplied with handsome clocks, damask curtains, and Venetian mirrors. Breakfast consists of five courses and dinner of eight. The sleeping cars are splendidly furnished, and have hot as well as cold water. The average speed is forty miles an hour.

A PATENT was not long since reported to have been issued for the manufacture of railway ties from paper made of coarse grass, or any kind of vegetable fiber capable of being reduced to pulp. Another patent is now reported for making ties from the fibrous residue of sugar cane. Something may possibly come of these experiments and patents, but our own impression is that white oak is the best, because it has been well tested, it is not patentable, and don't have to be reduced to pulp.

THE Wason Car & Foundry Co. (Chattanooga, Tenn.) is running full time on freight and mine cars, and will soon begin on a large order from the Cincinnati, New Orleans & Texas Pacific road. An extensive business is also doing in the foundry department. Mr. Wm. Cleave, formerly master car-builder of the C. C. C. & I. road, at Cleveland, O., has been appointed Assistant Superintendent of the company. Mr. Cleave has had large experience in car-building, and the plans of construction devised by him ten years ago are still adhered to by the above named road.

THE Jackson & Sharp Co., of Wilmington, Del., have just completed a palace hotel car for the Worcester (Mass.) Excursion Car Co. It is named "Edwin Forrest," and is 66 feet long, exclusive of platforms. The interior arrangement is of the most luxurious description, and includes everything in the way of costly decoration, and exquisite workmanship that modern invention can devise for a vehicle of this class. The car is the fourth one constructed for this company, and all are engaged by the Knights Templar for their trip to California to attend their grand conclave during the present month.

THE chief peculiarity of the Paige parlor and sleeping car is the method of forming the berths. The iron frame work is concealed between the backs of each pair of seats. By means of a crank this frame is raised to the desired height for the upper berth, and both upper and lower berths are formed by stretching from iron rods at either end a heavy canvas, which forms a sort of hammock, on which the bedding is placed. A rod of gas pipe is fastened at the head of the upper berth, forming a railing for the passenger to use in mounting and getting down. The advantages claimed for this style of berths are removing all the weight from the top of the car caused by the upper berths, thus preventing top-heaviness and greatly reducing the weight and number of parts of the sleeping attachments.

THE Chicago & Illinois road has received from the Haskell & Barker Car Works 200 twenty-ton coal cars, length 30 feet, side sills 4½ x 14 in., intermediate 4½ x 7¾ in. Iron body-bolsters are used, also four truss-rods, and the draw-timbers extend back to the needle-beams. The cars have M. C. B. axles and Hewitt box-lids. The road has also received recently 200 cars of the same description from the Terre Haute Car Co. Within the past year six day coaches, and two chair-cars, furnished with Hartley chairs, have been added to the passenger equipment. These cars, one 48 ft. long by 9 ft. 8 in. wide, were built by the Pullman Co., and have 42-in. Allen paper wheels Three cabooses of the road's standard, and five 28-ft. box cars have recently been built at the Danville (Ill.) shops. In the locomotive department, a Mogul engine that had been badly damaged in a collision has been rebuilt. It was so badly broken up that the boiler had to be sent to the shop on a flat car and the engine on a coal car. Mr. Allen Cooke is the Master Mechanic of the road.

AN inventor in Danville, Va., has patented what he no doubt considers a very effective method for facilitating the escape of the occupants of a car in case of train accidents. It consists in providing doors in the sides of the car, which are to be opened only in an emergency of danger when the usual means of exit are insufficient. They are hinged at the bottom, and open outwardly by being let down as a gang plank. The idea of side doors in passenger cars is not new. It is as old as the idea of end doors; but, unfortunately for the inventor, it is not practical, or cars would have been constructed that way long before this. The side frame of a passenger car must be continuous, both longitudinally and vertically, in order to have the requisite strength; and not only this, but the character of the inside construction and the arrangement of the seats and windows preclude the idea of side openings other than windows. Freight and baggage cars have side doors, and so could passenger cars if they were of the same size and construction and adapted to the same or similar uses.

THE Union Switch & Signal Co., of Pittsburg, Pa., has been engaged for some months in the work of applying its system of operating signals and the interlocking of switches to the intricate network of tracks at the Grand Central Depot in New York City. This is the terminal station of the New York Central & Hudson River; the New York & Harlem, and the New York, New Haven & Hartford roads. The whole number of trains arriving and departing every twenty-four hours is not far from 500, the management of which has heretofore required about forty switch and signal tenders to be constantly on duty. When the introduction of the automatic system of the above named company is completed, the same work will be done by two men operating a series of levers in the second story of a switch-house situated between the main tracks a short distance from the station building. The system has for some time been in successful operation at the Broad street station of the Pennsylvania road, in Philadelphia, the Boston & Albany station in Boston, and at other railway centers. With the improved devices that have been added to it in the matter of detail, it will be of immense advantage in securing greater safety, economy and rapidity of movement in the crossing and recrossing of the labyrinth of tracks by incoming and outgoing trains at the Grand Central Depot.

A FEW weeks ago, the New York *Evening Post* published a statement compiled from official statistics, showing that during a period of thirteen years, beginning with 1869 and ending with 1881 inclusive, there were 1,902 persons killed on the railroads of New Jersey, which is a yearly average of 146. This fearful aggregate has not been swollen by one or two, or even a half dozen train accidents of exceptional fatality, but the number killed each year ranges from 109 to 191, the figures altogether showing a pretty even distribution. The only official record from which this information could be derived would seem to be the annual reports of the railroad companies. There is, therefore, no reason for suspecting that the number is exaggerated, but on the contrary, that it is very considerably below the mark. No account is taken of the injured and maimed, the number of which must be vastly larger than the number actually killed. The railroads of New Jersey, in the matter of safeguards for the protection of human life, are probably not behind the roads of any other State with the same, or a greater amount of track mileage, and it is therefore reasonable to conclude that a proportionate number of persons are killed upon railroads in other parts of the country. It would be easy to calculate from the New Jersey data the total number of lives annually sacrificed on railroads in the whole country, but the figures would appear too incredible for belief, and we therefore refrain.

THE *Age of Steel*, of July 7, says: The smallest locomotive engine ever built in the United States for regular work was turned out by M. M. Buck & Co. this week and shipped to the Edmee plantation, St. Charles Parish, Louisiana. This little engine was designed by and built under the supervision of Mr. Jay Noble, and is as perfect a piece of mechanism as one could wish to see. Its diminutiveness may be understood from the following facts respecting it: 21½ inch gauge; diameter of cylinder, 6¼ inches; stroke, 10 inches; four wheels; diameter of driving wheels, 22 inches; height of engine to top of boiler, 4 feet 7 inches; weight without water, 5,250 pounds. The engine has link motion, and is made of the best materials throughout. The boiler is made of ¼-inch iron, and is 30 inches in diameter in the barrel. It is provided with an Orm patent pop valve, has a steel fire-box, and is fed by two inspirators. The tank is made of No. 10 iron, has four wheels of a diameter of 16 inches, a capacity of 380 gallons, and weighs without water 1,400 pounds. In experimenting with the engine before it was shipped, it was found to act very obediently under the hand of the engineer, being quick at starting and stopping. On a 90-foot track a good speed was attained, and the engine stopped before leaving the end of the track. It will be used on a portable railroad, in building which T iron, weighing only 10 pounds to the yard, will be used. This road, it may be added, is to be used for the transportation of sugar-cane, and will therefore be extended or moved as often as is necessary to keep it connected with that part of the field where the cutting of the cane is in progress. On this kind of a road the little engine is expected to draw 40 cars, measuring 8 feet in length in the bed, 5 feet wide, and 15 inches high, and loaded with 80 tons of cane.

Refrigerator Cars.

The following is the report of the Committee on the subject of Refrigerator Cars, made at the recent annual meeting of the Master Car-Builders' Association:

REPORT.

To the Master Car-Builders' Association:

Your committee, to whom was assigned the subject of refrigerator cars, have been left very much to their own resources. The answers to the circulars sent out by the committee have been few, and the replies received from master car-builders were mostly letters of regret that they could not furnish the information asked for owing to having had no experience with refrigerator cars, although nearly all agreed that in their opinion it would be better for railroad companies to own their own refrigerator cars and operate them with their own employés. Your committee would, however, here remark that the owning and operating of refrigerator cars by railroads is simply a matter of policy, with which, in the opinion of the committee, this convention has nothing to do, unless authorized by the managers of the railways represented in the association to take that question up. Your committee also believe that this matter of refrigerator cars would have been better treated had the question been given to a committee of experts in refrigeration and ventilation.

As to the cost of repairs of this class of cars, only one reply was received—that from the Missouri Pacific Railway, but as the mileage was not given we could not judge what the cost per car mile was. The mileage paid on these cars is the same as on ordinary freight cars, *i. e.*, three-fourths of 1 cent per mile.

The cost of building refrigerator cars is from $600 to $1,200.

We now come to the question of different forms of refrigerator cars now running upon railways in this country. Your committee have personally examined some of the cars and have had to rely for information upon descriptive circulars issued in relation to others. Your committee desire to say that it is rather difficult to convey a correct idea of the construction of refrigerator cars without a series of sketches, and these we have not had time nor opportunity to prepare, and beg the convention to bear with us if we fail to make our description of the cars as plain to them as it should be.

There are now before the public three kinds of refrigerator cars. The first is a car built on the supposition that all that is needed is a cool temperature. These cars are built on the principle of an ice-lined box, with the ends, sides and roof fitted with ice boxes, no arrangement having been made for the circulation of air or absorption of moisture. The second kind of car is that which provides a cool temperature and also a circulation of air. The third kind is that which provides a cool temperature and a constant circulation of air that is pure and dry. Your committee are of the opinion that the last-named car meets the want of carrying perishable lading. We believe the following details are essential in the construction of a refrigerator car to insure its success. The ice space should occupy as little room as possible; separation from the outside air should not increase the bulk of the car; large-sized pieces of ice should be used in preference to small, as the latter melts rapidly; the cooling properties of the ice-water should be used before being drained off; the drainage should be such that it would not stop up and slop over and spoil the goods; the ice-pans should be so constructed that there would be a free circulation of air around all of their surfaces, thus the full benefits of the cooling properties would be attained.

We will now proceed to consider the different classes of refrigerator car in use at present.

In the refrigerator cars run by the Chicago, Milwaukee & St. Paul Railway ice is put in from the sides into ice-pans at each end of the car; drain-pipes convey the water from these pans straight down to a trap in the bottom of the car, from which it is drawn off. The car which was examined (No. 5,432) did not appear to have any provision made for the circulation of fresh air.

The *Zimmerman*, old style, has its ice-box at the top of the car, extending its full length. This car has been used by the Anglo-American Packing Company. The Zimmerman improved car is fitted with ice-boxes in the ends of the car through which run a number of flues, which are intended to start the circulation of air and increase the cooling surface of the car.

Wickes' patent, run in the refrigerator dairy line by the Merchants' Despatch Transportation Company, has ice-pans in each end of the car 30 inches deep, 30 inches wide, extending across the entire end of the car. The ice-pans, which are made of galvanized iron, are filled with ice from the top of the car. The water is conducted from the ice-pan into troughs running across the end of the car and to the bottom of the car through a drainage-pipe. The ice-pans and troughs act as cold-air radiators.

The Chase Car is used for carrying dressed meats. In each end of the car are placed five cylinders 7 feet high and 16 inches in diameter; in the center of each cylinder is a pipe larger at the top than at the bottom; the cylinders are filled from the roof with salt and broken ice; drainage is had by valve at the bottom of the cylinder, operated by a rod running to the top.

The Ayer Refrigerator Car.—Thirty-one of this kind are running on the Chicago, Burlington & Quincy Railroad. The ice is put on a rack through doors opening outside in each end of the car; the waste water falls in a pan and runs out of the car through a pipe. The insulation is made by air spaces lined with sheets of rubber instead of felt or paper, the warm air passing in through openings in the car and through the ice.

The Post Refrigerator Car Company, just organized, have a car on exhibition, we believe, at the Chicago Railway Exposition, where members wishing to examine it may do so. They claim to have large cooling surfaces, comparatively small consumption of ice, free circulation of dry, cold air at low temperature, above or below freezing, as may be desired. What is generally wasted—the pickle—is retained in an auxiliary tank, and is of great assistance in checking the melting of the ice, and is a powerful agent in keeping the car cool when idle and the ice all melted out, thus not consuming ice and time in cooling it off preparatory to loading. It is also claimed for this car that there is a constant circulation of air around the ice-pans or chambers.

The Gouge system of ventilation as applied to refrigerator cars it is claimed by the inventor is a success. Your committee have not seen any car fitted under this system, nor have they seen any sketch of it as applied to freight cars. We understand that some of the members of the association are familiar with the working of it. The principle is to apply a powerful current of fresh air while the car is in motion, sweeping out all the noxious gases that may arise in the car, and keeping a constant supply of fresh, wholesome air around the freight.

The American Refrigerator Car.—In this car the ice-boxes are supplied from the roof and are at both ends of the car. The cold from the drip water is utilized as it runs off, passing through four troughs.

The Pennsylvania Railroad Company are now running a refrigerator car which is a compromise between the "Ridgeway" and the "Diamond" refrigerator cars. That parts of each are used in the compromise car your committee are unable to say, not having seen any of them; but we understand after a full investigation made by Mr. E. B. Wall, of that road, into the merits of the different refrigerator cars, that the present new car is built on a plan which, to his mind, is necessary to insure the success of a refrigerator car, and the results so far have been satisfactory to the officials of that road.

The Ridgeway Car, like the Ayer, the American refrigerator and others, has ice-boxes in the ends of the car, with the addition of a chamber for the circulation of air, not depending upon its circulation through the ice for its low temperature. The drainage water flows down from the box through a series of "V"-shaped troughs, backward and forward, until all the cooling properties of the water have become exhausted. The condensation on the lower sides of these troughs drops off into the trough below. The bottom of the lowest trough is of wood, so that there is no water to drop from it. The troughs are protected by a fence from the freight, the cold water, circulating through the troughs, creates a suction in the air passages behind the box, and warm air in the top of the car is drawn down over the water in the troughs, where it is dried and purified and passed out of the car. It is claimed that this car, besides fulfilling the conditions of circulation, of drying and purifying the air, has the advantages of taking full-sized cakes of ice, utilizing the cooling-properties of the water, perfect drainage and smallest space of ice-boxes, and the exposure of all sides of the ice-box to the car.

The Lorenz Refrigerator Car is being built at Hamilton, Ohio. The ice chambers are at the end of the car, and are so constructed that when not in use they can be nearly folded against the wall, leaving ordinary shipping room for freight. The car can be built to take ice from the sides or top. The walls have, first, the outside sheeting; second, the air space; third, a non-conducting composition sheeting; fourth, intermediate lining; fifth, non-conducting cork wall; sixth, inside lining. All of the air spaces, except those in the bottom of the car, are in free communication with each other. Openings in the end of the car permit of a circulation of air in and out of the entire jacket, and openings in the bottom of the car admit air into the air spaces in the bottom of the car. The floor slopes to the centre, and is provided with a draining slit covered with plate iron and provided with trap doors. There is a central trough which runs between the centre cills; it is of a galvanized iron and contains a retaining trap in the centre for its full length. A facing of galvanized iron runs around the base of the walls and is to prevent access of moisture to the timbers of the car. The inlet air pipes are of galvanized iron, and lie just within the inside lining, which is pierced to permit the cool interior of the car to exert a condensing influence on the air in the pipes, except that they reach from the interior of the car near the top to the air jacket near the bottom.

It is claimed for these cars that there is a free circulation of outside air passing through the inlet pipes, where it becomes cooled, sinks and enters the car at the bottom. Foul air in the car enters the outlet pipes and, becoming condensed, sinks and discharges into the air jacket next inside of the outer siding, where it is utilized in cooling the jacket, and the free circulation of fresh air always in this jacket drives the foul air out.

A very low consumption of ice is also claimed for this car. We understand that one of these cars will be on exhibition in Chicago at the Railway Exposition, where the members may examine it if they so wish.

The Tiffany Car has a V-shaped ice-pan extending the full length of the car, supported by wrought-iron hangers secured to the plate. The bottom of the pan is protected by a rack of 1 × ⅝-inch drips under the man holes, and helps the drainage. A smaller pan is supported by the same hangers that carry the larger one, and collects the moisture condensing in the bottom of the larger one. The water is drained off at each end of the small pan by a 2½-inch galvanized iron conductor pipe leading to a drip-pan under the car.

The insulation of the car is as follows: The sides are divided by two intermediate partitions of ½-in. stock boards into three spaces, of which two are air-tight, and one (the outer) ventilated. The dead air spaces are made much better by the use of four thicknesses of the Rock River Company's felt, with a good lap of not less than three inches at all joints and well locked in place by tinned tacks.

The Tiffany Company claim for this car the most nearly perfect insulation from the influence of outside temperatures, hot or cold. They claim that the atmosphere is kept dry by permitting a free circulation between the air in the car-chamber and the ice in the top of the car, by means of which all moisture in the air, with its impurities, is condensed upon the ice, and goes out in the drip water, thereby maintaining a constant circulation of dry, pure and cold air among the articles in transit. This company—the Tiffany—is well organized, full of vim and push, and the thanks of the committee are due to Mr. Perce, manager of that company, for information as to their cars.

The Central Pacific Fruit Car seems well adapted to carrying this class of perishable lading. The car is fitted up to run in passenger trains, having Miller platform and Westinghouse air-brake. At each end of the car and just above the platform is an opening 30 inches high and 6 feet wide, covered with wire cloth netting; inside of the netting are nine bars of ⅝ inch round iron running across the openings to keep out trespassers. There is also a cupola built on the roof, and in the center of the car at each end of the cupola there is an opening 10½ inches high and the width of the cupola covered with wire cloth and protected by iron bars. Inside the cupola there is still another partition of wire cloth, and then from the center of the cupola hangs a partition covered with zinc, against which the current of air strikes, and is deflected downward into the car. While the car is in motion there is a constant stream of fresh air carrying off all foul air that may arise from the freight. Ice is not carried in this car. For the carrying of fruit we consider it one of the best cars in use.

There are other refrigerator cars not spoken of in this report, but your committee have had no opportunity to examine them.

In conclusion, we would say that we think too little attention has been paid to this question by car-builders and railroad men. The fact that of all the answers received from master car-builders but one or two ventured to express an opinion shows how little they have thought on the subject.

In our opinion the reason why railroads do not own or control their own refrigerator cars is that they have failed to provide suitable cars to carry perishable lading, and outside parties have been compelled to devise and build cars of their own.

To make a refrigerator car what it ought to be, it is our opinion that there should be a circulation of dry, pure air, the ice-boxes should be exposed on all sides to the car, thus getting the cold radiation from them and allowing the air to circulate freely around them; the drainage should be perfect so that the water would not slop over and spoil the freight; the cooling properties of the water should be utilized before escaping from the car. We think that the car should be built longer than the ordinary box car, so that after taking up space for the ice chambers, etc., there would still be room for a full car-load of freight. We would also say that the insulation should be as nearly perfect as possible.

We elsewhere state that the Pennsylvania Railroad Company was running a new refrigerator car. This road never does things by halves, and we think it would be well for members interested in this question to watch the experiment now being made by that company, if we may call it an experiment. We believe that with all the appliances, scientific and mechanical, of which that road is possessed, their car will be a success.

In describing the various kinds of cars, we do not intend to recommend or condemn any only in so far as they come up to or fall short of what we have considered essential in a good refrigerator car, and at the same time we would say that opinions differ as to what comprises the essentials of a good refrigerator car, and we offer our opinion for what it is worth.

THOMAS AYLESBURY, *Chairman.*

REPORT OF COMMITTEE ON THE ECONOMY OF GRINDING CAST-IRON WHEELS.

To the Master Car-Builders' Association.

Your committee on the economy of grinding cast-iron wheels thought best to base their report on the experience of those who have been using them. We therefore sent out circulars to all parties that have machines and have been grinding wheels. The following is a copy of the circular sent, which calls for information desired:

1. Is it injurious to wheels in any way to grind them?
2. If, in grinding a flattenned spot, do you get the same wearing qualities from this spot after grinding as from the rest of the wheel?
3. Do passenger cars ride perceptibly smoother after grinding?
4. How much out from a true circle do you find new wheels?
5. Are there any special benefits derived that you could name?

We have received the following from the various roads, out of 20 circulars sent out:

Mr. B. McDevitt, master car-builder Chicago West Division Railway says:

"My opinion is that it is an improvement to have cast iron-car wheels trued up in the grinding machine, for the reason that by doing so the coach or car mounted with them will ride easier, draw easier and have less wearing effect on the rail.

"It does not injure the wheels to have them ground, unless a three-dog chuck is used in the boring operation. In that case, if a wheel with a flat spot and out of true (as I find many of them from 1-16 to 5-16 of an inch out) should come to be bored, the effect would be to bore the wheel out of center, and then when it is placed in the grinding machine it is liable to grind off too much of the chill from one part of the wheel. This difficulty can be obviated by dispensing with the three-dog chuck in the boring, and substituting a chuck that will touch the wheel at five or six points. By this means a true center can be obtained and then best results will be obtained in the grinding machine. I am satisfied that it will pay any railroad company to adopt the principle of truing their car wheels.

"I am satisfied that trued wheels will wear longer than wheels that have not been trued, and that the mileage will be largely in favor of the truing process. Also, when an old wheel has worn flat, so as to make it necessary to take it out of service, by placing it in the grinding machine, it can be trued again, and at least one-third of the original wear can be obtained, which is an advantage in place of selling it off for scrap.

"In my experience of new wheels I find them out of true all the way from 1-16 to 5-16 of an inch. In fact, it is nearly impossible to find a perfectly true wheel. This is easily accounted for by the present process of casting car wheels against a chill. The hot metal striking the further side of the chill first will naturally cause it to contract, and the longer the pouring of the metal continues the more the wheel will be out of true. If a process could be devised of pouring the metal instantaneously, then we may expect to get a true wheel, or very nearly so."

H. W. Sample, superintendent of motive power and machinery, Denver & Rio Grande Railway Company, says:

"We have not had the car wheel grinder in use long enough to be able to answer your question from experience, except that passenger coaches do ride perceptibly better with ground wheels. I am satisfied, however, that it is a paying machine."

John F. Kidder, general superintendent Nevada County Narrow-Gauge Railroad, says:

"I have in use on this road the second Gowan chilled wheel grind machine ever used, and it has always worked to my entire satisfaction. I find upon turning new wheels in the machine before grinding them that they are nearly a quarter of an inch out of true. The difference in riding of the cars is plainly perceptible, the cars riding much smoother and with a humming sound. I grind wheels some three times after the first flattening, and notice that with the second grinding they will run as long as the first time they were put under the car—the third time not quite as long. I consider the grinding of wheels as a decided improvement, and one, I think, no road will do without after once trying."

T. N. Ely, superintendent motive power, Pennsylvania Railroad, Altoona, Pa., says:

"1. We do not consider that grinding wheels affects them injuriously in any way, provided the chill of the wheel is of sufficient depth to allow the flat spot or irregularity to be trued up without going below the chill.

"2. We get the same wear from a ground wheel, provided the chill is of sufficient depth, that we do from a new wheel.

"3. We think the passenger cars do ride smoother with ground wheels.

"We have seen cast wheels as much as ⅛ inch out of round."

C. L. Reese, master mechanic and car-builder of the South Pacific Coast Railroad Company, says:

"We have had one of the Gowan grinding machines in use for the past three years, and we grind both new and old wheels.

"I find it a benefit to grind *new wheels*. On an average we do not get the same wearing qualities from a flattened spot after grinding, as the spot is generally softer than the rest of the wheel if the chill is not more than ⅜ inch deep.

"I also find that passenger cars ride perceptibly smoother after grinding, as I find some new wheels ⅛ inch from a true circle, which causes our cars to jump when running 40 miles per hour with 24-inch wheel."

Mr. C. E. Garey, master car-builder New York Central & Hudson River Railroad Company, says:

"Have been using the grinding machine about six months, and from my experience and observation I think it is not injurious to grind wheels, but my experience has been too short to give positive proof either way.

"If the iron has been heated hot enough to show fine checks, which it frequently does in slides say over 1½ inches, I think the iron will crumble out after a time and leave a hole in the tread, but where the iron retains its solidity, as it frequently does in small spots, I think we get the same wearing qualities under a flattened spot after it is ground out as before.

"Passenger cars ride decidedly smoother with ground wheels.

"I find wheels from a small trifle to nearly ¼ of an inch out of a true circle. When we first commenced grinding wheels I was surprised to find them so much out of round, some of them being nearly ¼ of an inch. Our boring mill was comparatively new, and we thought as good as the best, and the three-dog chuck appeared to center the wheel perfectly, but as the car wheel grinding machine company had kindly sent me a set of six-point dogs, I concluded to fix them up, and was highly gratified with the result, as the maximum irregularity in the most cases now hardly reaches ⅛ of an inch. I would advise any company to use six-point dogs instead of three, whether they grind their wheels or not.

"I certainly think there are special benefits derived from grinding wheels, viz.: Easier riding cars, less wear and tear of rolling stock and track. Again, I suppose it is self-evident that a round wheel is better than one out of round to run railroad cars on; and as yet I have not found a sharp flange on ground wheels, from which I infer that in addition to having the wheels round it insures having them of the same size on the same axle. Again, imagine a warped or crooked wheel with one a trifle larger on the same axle, causing the flange to hug the rail, and you get that lateral motion or trembling sensation sometimes found in passenger trains, which it is difficult to account for in any other way. Now, in grinding the wheels they are so much improved as to lose almost entirely that difficulty.

"With us, we think there is more gained by grinding new wheels than old ones, as we seldom if ever use anything but new wheels and axles under our passenger equipment. Consequently, all our second-hand wheels, whether ground or not, go under freight cars, and it will require several years to tell what service they give there."

As this subject is comparatively new, and but few men, if any, have had experience sufficient to enable them to determine the real value of grinding cast-iron wheels your committee thinks there is economy in this process; but, like the gentlemen whose letters have been read to you, we are unable as yet to determine to what extent there is economy in grinding cast-iron wheels, as we have been unable to get any data that would help us to solve the question intelligently.

L. PACKARD, *Chairman.*

Mr. WALL opened the discussion, saying that as the report was so comprehensive not much remained to be said. The different makes had all been described and their traits pointed out.

Mr. CLOUD followed, and said that he would do away with the use of salt in refrigerator cars altogether and reduce the moisture as much as possible. The water from the ice should all run away. He would use no chemicals, neither would he have it dry or wet. The temperature should be kept above freezing. The Pennsylvania Railroad stored their ice overhead, so as not to interfere with the return freight.

Some discussion ensued, the idea prevailing that moisture should not get at the freight, and that a circulation of air should be had.

Mr. WALL stated that the committee did not recommend any particular car, although in some way their names had become attached to the Lorenz Refrigerator Car Company's circular without their intention. The subject was then declared closed.

Not long since, a peculiar accident occurred on a railroad upon which a locomotive was running "light" and got off the track. The back axle was bent and one of the back driving-boxes broken, but she was replaced on the track by her own exertions under the management of the ingenious and capable engineer. He placed two jacks under the foot-board at the back end, and relieved the springs of the weight. The driver-springs and side-rods were then disconnected and placed on the tender. The back end of the engine was then jacked up until the forward pedestal brace or binder came in contact with the oil cellar. A block of wood *a*, Fig. 1, was then fitted in between the top of front driver-boxes and the frame. One of the jacks was then placed under the back axle, which was raised as high as the jaw would permit, and a piece of wood, *b*, fitted between the back oil cellars and the binder braces. The entire weight of the back part of the engine was then carried by the front drivers, clearing the track several inches, as shown. In this condition, the engine was run by steam upwards of 80 miles. Had the accident involved the front pair of drivers, and not the back ones, it is evident that towing would have been necessary, although the front drivers might have been raised in the boxes and the weight carried on the back ones. Ordinarily the plan would have been, in such case, to place two or three pieces of rail, *c*, Fig. 2, with their front ends resting on the back driving-axle, which is blocked up in the jaws by the block *d*, and their back ends supported on a common freight truck, as shown.

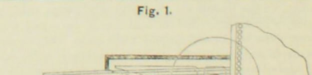


Fig. 1.

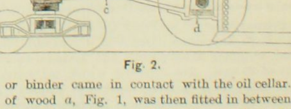


Fig. 2.

MR. JULIUS PINTSCH.—of Berlin, has been awarded a gold medal for his system of lighting cars, steamboats, buoys and beacons by compressed gas, at the German General Exhibition of hygienic and life saving service just held in Berlin. The medal was presented by the Crown Prince in person.

Awards of the Juries at the Chicago Exposition.

The following is the list of the awards made to exhibitors by the juries at the Chicago Exposition of Railway Appliances :

DEPARTMENT A—ROLLING STOCK.

Class No 1—Locomotives.

Best display of locomotives, grand gold medal—Brooks Locomotive Works.
" Narrow-gauge passenger, gold medal—Brooks Locomotive Works.
" Standard-gauge freight, gold medal—Baldwin Locomotive Works.
" Narrow-gauge freight, gold medal—Baldwin Locomotive Works.
" Switching, gold medal—Brooks Locomotive works.
" Logging and mining, gold medal—H. K. Porter & Co.
" Locomotive involving important new principles, gold medal—Philadelphia & Reading R. R. Co.
" Locomotive clock, bronze medal—Crosby Steam Gauge & Valve Company.
" Steam gauge cock, bronze medal—James B. Clow & Son.
" Stop cock, bronze medal—James B. Clow & Son.
" Locomotive headlight (to burn oil), gold medal—Headlight Signal Co.
" Steam gauge, silver medal—Ashcroft Mfg Co.
" Water gauge, bronze medal—Jas B. Clow & Son.
" Gauge test pump, bronze medal—Jas. P. Marsh & Co.
" Locomotive bell, silver medal—Jas. B. Clow & Son.
" Locomotive oiler, bronze medal—A. W. Swift.
" Wire cloth, bronze medal—Clinton Wire Cloth Co.
" Locomotive safety valve, silver medal—D. E. Pierce.
" Steam muffler, silver medal—Crosby Steam Gauge & Valve Co
" Steam whistle, silver medal—Jas. B. Clow & Son.
" Filterer for water for locomotive, bronze medal—Farquhar-Oldham Filter Co.
" Boiler rivets, bronze medal—Hoopes & Townsend
" Elevated railway system, gold medal—Richard P. Morgan.
" Sand dryer, silver medal—Johnson & Hartwell.
" Locomotive steel forgings, gold medal—Midvale Steel Co.
" Locomotive ash pan, bronze medal—W. H. D. Newth.
" Pop valve, silver medal—Consolidated Safety Valve Co.
" Piston packing expander, bronze medal—Winona Machinery Co.
" Rachet drill attachment, bronze medal—J. A. Wilson.
" Locomotive and car iron forgings, silver medal—Wilson, Walker & Co.
" Automatic oiler, bronze medal—Yost Car Axle Lubricator Co.
" Locomotive feed door, bronze medal—Butman Furnace Co.
" Boiler cleaner, bronze medal—J. F. Hotchkiss.
" Pressure gauge, silver medal—Yale & Towne Mfg. Co.
" Time speed and pressure, bronze medal—Edson Recording Alarm Gauge Co.
" Recording alarm and gauge, bronze medal—Edson Recording Alarm Gauge Co.

Class No. 2—Cars.

Best display of cars, gold medal—Pullman Palace Car Co.
" Private or officer's, gold medal—*Railway Age.*
" Dining, gold medal—Pullman Palace Car Co.
" Sleeping, gold medal—Pullman Palace Car Co.
" Day, gold medal—Jackson & Sharp Co.
" Mail, gold medal—Harrison Bag Rack Co.
" Baggage, silver medal—Pullman Palace Car Co.
" Stock, gold medal—New York Live Stock Express Co.
" Box, silver medal—St. Charles Car Co.
" Flat or gondola, silver medal—U. S. Tube Rolling Stock Co.
" Coal, ore or gravel dump, silver medal—U. S. Car Co.
" Wrecking, silver medal—Bucyrus Foundry & Machine Co.
" Road or section master's, silver medal—Fairbanks, Morse & Co.
" Hand, silver medal—Fairbanks, Morse & Co.
" Velocipede, silver medal—T. B. Jeffrey.
" Tank car, silver medal—Chester Oil Co.
" Caboose car, silver medal—La Fayette Car Co.
" Smoking car, silver medal—Pullman Palace Car Co.

Class No. 3—Running Gear.

Best steel axle (Master Car-Builder's Standard), silver medal—Midvale Steel Co.
" Iron axle (Master Car-Builder's standard), silver medal—Pittsburgh Forge & Iron Co.
" Passenger train brake, gold medal—Westinghouse Air Brake Co.
" Brake shoe, silver medal—Congdon Brake Shoe Co.
" Springs (elliptic), gold medal—A. French & Co.
" Springs (bearing), silver medal—A. French & Co.
" Springs (buffer or draw), bronze medal—French Spiral Spring Co.
" Equalizing spring, silver medal—Cliff & Righter.
" Draw bar for freight cars, silver medal—Continuous Draw Bar Co.
" Journal box lid, silver medal—W. J. Watson.
" Journal bearing, silver medal—D. A. Hopkins.
" Steel tire for car wheels, gold medal—Midvale Steel Co.
" Steel tire combination wheel, gold medal—Allen Paper Car Wheel Co.
" Car step, bronze medal—T. B. Howe.
" Passenger car platform, coupler and buffer, gold medal—McConway, Torley & Co.
" Passenger car six wheel truck, gold medal—Suspension Car Truck Co.
" Automatic freight car coupler, silver medal—McConway, Torley & Co.
" Display car wheels, gold medal—Allen Paper Car Wheel Co.
" Electric brake, gold medal—Waldumer Electro-Magnetic Brake Co
" Transfer table, silver medal—N. W. Robinson.

Class No. 4—Interior Furnishings for Passenger Cars.

Best display, gold medal—Post & Co.
" Car door lock, bronze medal—Post & Co.
" Seat end, silver medal—Hale & Kilburn.
Best Seat end lock, bronze medal—S. A. Smith.
" Seat end fixtures, bronze medal—Gardner & Co.
" Curtain goods, silver medal—F. W. Devoe & Co.
" Curtain roller, bronze medal—Samuel Laycock & Son
" Head lining (wood), silver medal—Hale & Kilburn
" Window blind, bronze medal—I. G. Wilson.
" Seat frame, silver medal—Hale & Kilburn.
" Upholstering, silver medal—Hale & Kilburn.
" Display fancy woods and veneers, gold medal—The E. D. Albro Co.
" Berth and seat springs, silver medal—E. L. Bushnell.
" Wash-room pump, silver medal—J. B. Clow & Son.
" Cooking range, silver medal—Stephen Wilkes.
" Reclining chair, silver medal—Marks Adjustable Folding Chair Co.
" Revolving chair, silver medal—Marks Adjustable Folding Chair Co.
" Washstand for parlor or sleeping car, complete, silver medal—Hale & Kilburn.
" Basket rack, silver medal—Post & Co.
" Door holder, bronze medal—Pullman Door Check Co.
" Door knob, bronze medal—Yale & Towne Mfg. Co.
" Cuspidore or spittoon, bronze medal—Eureka Iron Co.
" Headboard fixtures (for sleeping car), bronze medal—Post & Co.
" Folding bed for car, complete, silver medal—Hale & Kilburn.
" Electric or other call bell, bronze medal—Western Electric Co.
" Window ventilator, bronze medal—H. H. Reynolds.
" Car seat, complete, silver medal—Hale & Kilburn.
" Display of metal trimmings, gold medal—Union Brass Co.
" Display of glass veneers, silver medal—Glass Veneer Co.
" Method of lighting cars, gold medal—J. M. Foster.
" System of closet ventilation, silver medal—E. Y. Bell.
" Elevated, gravity and mining railway, gold medal—Chicago Elevated Ry. Co.

Class No. 5—Freight Car Appliances.

Best car seal, bronze medal—E. J. Brooks.
" Car replacer, silver medal—M. S. Shotwell.
" Car pusher, bronze medal—C. T. Barnes.
" Grain car door, silver medal—D. F. Van Liew.
" Freight car door, silver medal—E. E. Pratt.
" End door inside fastener, bronze medal—W. J. Watson.
" Freight car lock, bronze medal—Yale & Towne Mfg. Co.
" Door hanger, bronze medal—S. H. & E. Y. Moore.
" Metal roofing, silver medal—Empire Car Roofing Co.

DEPARTMENT B—MACHINERY.

Class No. 1—Wood Working.

Best display of wood-working machinery (not less than six machines), grand gold medal—J. A. Fay & Co.
" Planing and matching machine, to plane twenty-four inches wide and under, and not match less than twelve inches, gold medal—Goodell & Waters.
" Flooring and beading machine, gold medal—J. A Fay & Co.
" Dimension planing machine, with carriage and roll feed for dressing out of wind and surfacing, silver medal—J. A. Fay & Co.
" Daniels or traverse planing machine, silver medal—J. A. Fay & Co.
" Double surfacing machine to dress on one or both sides, twenty-six inches wide and eight inches thick, and under, gold medal—J. A. Fay & Co.
" Surfacing machine for smoothing purposes, gold medal—J. A. Fay & Co.
" Band saw machine for general work, silver medal—Goodell & Waters.
" Band saw for re-sawing, to re-saw twenty-four inches wide and under, silver medal—J. A. Fay & Co.
Best Railway cutting-off saw machine, with traversing arbor for timbers, silver medal—J. A. Fay & Co.
" Ripping saw with elevating arbor, silver medal—J. A. Fay & Co.
" One spindle horizontal boring machine, silver medal—J. A. Fay & Co.
" Three spindle horizontal boring machine, silver medal—J. A. Fay & Co.
" Radial horizontal boring machine, silver medal—J. A. Fay & Co.
" Three spindle vertical boring machine, silver medal—J. A. Fay & Co.
" Automatic car gaining machine, silver medal—J. A. Fay & Co.
" Vertical car tenoning machine, silver medal—J. A. Fay & Co.
" Vertical tenoning machine with movable carriage for timber work, silver medal—J. A. Fay & Co.
" Tenoning machine with copes for cabinet and general work, silver medal—J. A. Fay & Co.
" Vertical spindle shaping and edge molding machine, silver medal—J. A. Fay & Co.
" Universal wood worker and molder, silver medal—J. A. Fay & Co
" Straight molding machine to work four sides, silver medal—J. A Fay & Co.
" Surface polishing machine, silver medal—J. A. Fay & Co.
" Automatic knife grinding machine and saw sharpener, silver medal—Harold & Bush.
" Wood turning machine for pattern makers' use, silver medal—J. A. Fay & Co.
" Reciprocating and mortising machine, silver medal—J. A. Fay & Co.
" Timber dressing machine with capacity of reducing 16 inches or over and 12 inches thick, or over, silver medal—J. A. Fay & Co.
" Circular re sawing machine, silver medal—Goodell & Waters.
" Hollow chisel mortising machine, silver medal—Greenlee Bros.
" Self-feeding rip saw, bronze medal—Greenlee Bros.
" Automatic saw sharpener, silver medal—Halliday, Litchfield & Co.
" Lumber dryer, silver medal—H. I. Kimball.
" Flexible shafting, bronze medal—Stow Flexible Shaft Co.

Class No. 2—Iron Working.

Best display of iron-working tools (power), not less than six in number, grand gold medal—Pratt & Whitney Mfg. Co.
" Axle turning machinery, silver medal—Machine Tool Works, Philadelphia.
" Car wheel boring and turning machine, gold medal—Machine Tool Works, Philadelphia.
" Six spindle drilling machine, silver medal—Niles Tool Works.
" Hydraulic wheel press, silver medal—Machine Tool Works, Philadelphia.
" Wheel grinding or trueing machine, silver medal—Chilled Car Wheel Grinding Co.
" Iron planing machine, silver medal—Machine Tool Works.
" Iron crank shaping machine, silver medal—Pratt & Whitney Manufacturing Co.
" Screw cutting engine lathe, silver medal—Wm. Sellers & Co.
" Upright drilling machine, silver medal—Wm. Sellers & Co.
" Radial drilling machine, silver medal—Machine Tool Works.
" Bolt heading machine, silver medal—National Machinery Co.
" Bolt forging machine, silver medal—National Machinery Co.
" Bolt and screw cutting machine, silver medal—National Machinery Co.
" Set screw machine, silver medal—Pratt & Whitney Manufacturing Co.
" Power hammer, silver medal—Machine Tool Works.
" Power punch and shears, silver medal—Hercules Iron Works.
" Planer chuck, silver medal—Pratt & Whitney Mfg. Co.
" Universal and independent chuck, over twelve inches in diameter, silver medal—E. Horton & Son.
" Universal lathe chuck, twelve inches and under, silver medal—E. Horton & Son.
" Assortment of lathe chucks, silver medal—E. Horton & Son.
" Assortment of planer chucks, silver medal—E. Horton & Son.
" Display of Emery grinding machinery, silver medal—Northampton Emery Wheel Co.
" Display of machinists' vices, silver medal—Fisher & Norris.
" Display of taps and dies, silver medal—Pratt & Whitney Mfg. Co.
" Nut tapping machine, silver medal—Shumway, Burgess & Co.
" Drill grinding machine, silver medal—Wm. Sellers & Co.
" Slotting machine, silver medal—Machine Tool Works.
" Driving wheel lathe, gold medal—Wm. Sellers & Co.
" Shafting, gold medal—Jones & Laughlins.
" Hanger, bronze medal— " "
" Pulley, " " — " "
" Flue welding device, bronze medal—Hartz & Fix.
" Portable power drill, bronze medal—Thos. H. Dallet & Co.
" Spring tester, silver medal—Tinius Olson & Co.
" Display of tools for repairing locomotives, silver medal—Flanders Machine Works.
" Hot air pumping engine, silver medal—C. H. Delamater & Co.
" Machine for testing strength of metals, gold medal—Fairbanks, Morse & Co.
" Vertical boring mill, silver medal—Wm. Sellers & Co.
" Horizontal boring machine, silver medal—Wm. Sellers & Co.

DEPARTMENT C—TRACK GOODS.

Class No. 1.

Best Display of steel and iron rails and track goods, grand gold medal—Cambria Iron Co.
" Track laying device, gold medal—American Railway Construction Co.
" Track bolt and nut, bronze medal—Hoopes & Townsend.
" Track bolt washer, bronze medal—Pratt Mfg. Co.
" Railway fencing, silver medal—Western Fence Co.
" Claw bar, bronze medal—Crerar, Adams & Co.
" Cross tie (metal), silver medal—D. S. Whittenhall.
" Power excavator, gold medal—Wilcox & Stock.
" Crossing, silver medal—Morden Frog and Crossing Co.
" Fish and angle plate, silver medal—Morris Sellers & Co.
" Track jack, bronze medal—Jenny Jack (Pettibone & Milliken, Agts).
" Jack screw, bronze medal—Crerar, Adams & Co.
" Shovel, bronze medal—Hussy Binmm & Co.
" Track level, bronze medal—Crerar, Adams & Co.
" Nut lock, silver medal—Van Kuren Elastic Nut Lock Co.
" Scraper, silver medal—L. Pennocks & Sons Co.
" Track gauge, bronze medal—Crerar, Adams & Co.
" Spikes (one keg), bronze medal—W. Goldie.
" Switch, silver medal—Gray Switch Co.
" Switch lock, bronze medal—Post & Co.
" Switch stand, bronze medal—Fairbanks & Co.
" Track broom, bronze medal—Phœnix Steel-Wire Broom & Brush Co.
" Barrow, bronze medal—C. W. Hunt.
" Complete track joint, silver medal—W. F. Gould.
" Iron fence post, bronze medal—American Iron Post Construction Co.
" Ballast unloader, silver medal—Bucyrus Foundry & Machine Co.
" Tracklaying car, silver medal—Bucyrus Foundry & Machine Co.
" Yard switch, silver medal—H. & H. Elliot.
" Automatic railway for storing coal, etc., silver medal—C. W. Hunt.
" Hoisting rope, bronze medal—G. B. Carpenter & Co.
" Tie bar, bronze medal—Morden Frog & Crossing Co.
" Device for preventing derailment of cars, bronze medal—Jeanty Denechaud.
" Brace or head chair for switches, bronze medal—Weir Frog Co.
" Railway plow, bronze medal—Kilbourne & Jacobs Mfg. Co.
" Snow-plow, gold medal—Hawley Steam Snow Excavator Co.
" Crane, gold medal—Industrial Works, Bay City, Mich.
" Derrick, silver medal—Yale & Towne Mfg. Co.
" Car truck shifting apparatus, silver medal—R. H. Ramsey, Phila.
" Culvert pipe, silver medal—Blackmer & Post, St. Louis, Mo.
" Automatic danger signal, silver medal—Thos. H. Gibbons.

DEPARTMENT D.

Metals.

Best car wheel iron, gold medal—Barnum, Richardson & Co.
" Flanging iron, silver medal—Eureka Iron Co.
" Boiler plate (iron), silver medal—Eureka Iron Co.
" Display iron ores, gold medal—Barnum, Richardson & Co.

DEPARTMENT E.

Class No. 1—Station and Office Appurtenances.

Best baggage barrow, bronze medal—Penfield Block Co.
" Baggage check, silver medal—W. W. Wilcox.
" Engraved folder, silver medal—Rand, McNally & Co.
" Display of general office printing, silver medal—Rand, McNally & Co.
" Dating stamp, bronze medal—B. B. Hill Mfg. Co.
" Canceling stamp, bronze medal—B. B. Hill Mfg. Co.
" System of passenger tickets, silver medal—Rand, McNally & Co.
" Desk for railway offices, silver medal—A. H. Andrews & Co.

Pumps and Water-Station Appliances.

Best steam pump for water-station, gold medal—Fairbanks, Morse & Co.
" Hand pump for water-station, bronze medal—Fairbanks, Morse & Co.
" Hydraulic ram, bronze medal—J. B. Clow & Co.
" Track scale, gold medal—Fairbanks, Morse & Co.
" Platform scale, silver medal—Fairbanks, Morse & Co.
" Water tank, silver medal—U. S. Wind Engine & Pump Co.
" Water-tank fixtures, silver medal—J. N. Poage.
" Wind-mill for water-stations, silver medal—Fairbanks, Morse & Co
" Freight or warehouse truck, bronze medal—Fairbanks, Morse & Co.
" Silver service for private car, silver medal—*Railway Age* Publishing Co.
" Letter file, bronze medal—Cameron, Amberg & Co.
" Money bag for transporting specie and currency, bronze medal—W. H. Sanford
" Safety plate for frogs, bronze medal—Black & English.
" Type writer, silver medal—E. Reminton & Sons.
" Telegraph and telephone wire, silver medal—Roebling Sons & Co.
" Ticket case, silver medal—L. J. Blades.
" Letter press, bronze medal—Fairbanks, Morse & Co.
" Display of registering devices, bronze medal—Beadle & Courtney.
" Baggage check holder, bronze medal—T. Abbott.
" Ticket holder, bronze medal—W. B. Van Amringe.
" Watch case for railway use, silver medal—Hagstog & Thorpe.
" Anti-dust and water-proof watch case for railway use, silver medal—Giles Bros. Mfg. Co.
" Conductor's and engineer's watch, silver medal—Giles Bros. Mfg. Co.
" Tower clock movement for depot, silver medal—Giles Bros. Mfg. Co.
" Anti-magnetic shield for watches, bronze medal—Giles Bros. Mfg. Co.
" Portable chronometer, silver medal—Giles Bros. Mfg. Co.
" Station indicator and clock combined, bronze medal—J. C. McKenzie.
" Station train directory, silver medal—Wheeler & Wilson Mfg. Co.
" Station indicator for trains, bronze medal—Wheeler & Wilson Mfg. Co.

DEPARTMENT G.

Oils, Varnish and Paints.

Best display of passenger car body colors, including samples of work, gold medal—F. W. Devoe & Co.
" Display of freight car body paints, including samples of work, silver medal—Carey, Ogden & Parker.
" Display of wood filler, including samples of work, silver medal—Bridgeport Wood Finishing Co.
" Lard oil, silver medal—F. S. Pease.
" Lubricating oil (passenger car), silver medal—F. S. Pease.
" Lubricating oil (freight car), silver medal—F. S. Pease.
" Headlight oil, 175° fire test, silver medal—F. S. Pease.
" Lamp oil, 300° fire test, silver medal—F. S. Pease.
" Valve oil, silver medal—F. S. Pease.
" Car grease, bronze medal—F. S. Pease.
" Oil tank with pump, bronze medal—F. C. Wilson & Co.
" Display of paint brushes, silver medal—F. W. Devoe & Co.
" Surfaces, silver medal—Murphy & Co.
" Lamp and flag holder, bronze medal—F. W. Coolbaugh.

DEPARTMENT H.

Miscellaneous.

Best rubber belting, silver medal—Hamilton Rubber Co.
" Conductor's ticket punch, silver medal—L. O. Crocker.
" Rubber hose, bronze medal—Hamilton Rubber Co.
" Brake hose, bronze medal—Hamilton Rubber Co.
" Track signal (torpedo), bronze medal—F. Munn (Pettibone & Mulliken, agents)
" Surveyor's transit, silver medal—W. Jordan & Son.
" Surveyor's field glass, bronze medal—L. Manasse.
" Display of surveyor's instruments, gold medal—Keuffel & Esser
" Variety engineer's drawing tools, bronze medal—L. Manasse.
" Engineers level, bronze medal—W. Jordan & Son.
" Engineer's barometer, bronze medal—L. Manasse.
" Set engineer's railway curves, bronze medal—Keuffel & Esser
" Leveling rod, bronze medal—Keuffel & Esser.
" Prismatic compass, bronze medal—L. Manasse.
" Train badge, bronze medal—W. W. Wilcox.
" Time Detector, bronze medal—E. Imhauser.
" Electric signalling device for block or other signals, gold medal—Union Switch & Signal Co.
" Semaphore, silver medal—Corning Glass Mfg. Co. (Adams & Westlake Mfg. Co., agents).
" Registering devices, silver medal—Beadle & Courtney.
" Ventilated ceiling, silver medal—John Stephenson Co. (Limited).
" Time detector, electric clock and register, silver medal—Western Electric Co.
" File (cast iron), silver medal—M. A. Howell.
" Fire-proof insulating, bronze medal—Chicago Insulating Co.
" Electric motor for stationary purposes, gold medal—United States Electric Light Co.
" Electric railway system, gold medal—Electric Railway Company of United States.
" Drawing-table, bronze medal—Keuffel & Esser.
" Dynagraph and track inspection car, gold medal—P. H. Dudley.
" Depot signal, silver medal—Union Switch & Signal Co.
" Key relay and sounder complete, silver medal—Western Electric Co.
" Display telegraph instruments and supplies, silver medal—Western Electric Co.
" Stop signal lamp, bronze medal—Underhill, Osborne & Co.
" Display of signal lamps, silver medal—Underhill, Osborne & Co.
" Locomotive signal lamp, bronze medal—Underhill, Osborne & Co.
" Railway surgical dressings, bronze medal—Seabury & Johnson.

DEPARTMENT I.

Street Railway Appliances.

Best iron wheel, silver medal—Baltimore Car Wheel Co.
" Car, gold medal—J. G. Brill & Co.
" Car spring, silver medal—French Spiral Spring Co.
" Draw spring, bronze medal—French Spiral Spring Co.
" Bell cord and fixtures complete, bronze medal—John Stephenson Co (Limited).
" Fare box, silver medal—J. B. Slawson.
" End lamp, bronze medal—John Stephenson Co (Limited).
" Hand rail bracket, bronze medal—John Stephenson Co (Limited).
" Journal bearing, bronze medal—John Stephenson Co. (Limited).
" Door locks, bronze medal—John Stephenson Co. (Limited).
" Registering punch, bronze medal—Beadle & Courtney.
" Registering device, bronze medal—E. Chesterman, "Portable."
" Sheave for sliding door, bronze medal—John Stephenson Co. (Limited).
" Door handle, bronze medal—John Stephenson Co. (Limited).
" Life guards, silver medal—John Stephenson Co. (Limited).
" Street car truck, silver medal—Suspension Car Truck Company.
" Street car switch, bronze metal—A. L. Johnson.
" Street car turn table, silver medal—Wm. Wharton, Jr. & Company.
" Street car crossing, silver medal—Wm. Wharton, Jr. & Company.
" Stationary registering device, silver medal—Lewis & Fowler.
" Street car axle box, silver medal—John Stephenson Co. (Limited).

MISCELLANEOUS AND UNCLASSIFIED.

Best tube welding machine, bronze medal—Manning, Maxwell & Moore.
" Cupola, silver medal—Colliau Furnace Co.
" Malleable iron castings, bronze medal—Cleveland Malleable Iron Co.
" Fire hose, bronze medal—Eureka Fire Hose Co.
" Fire clay brick, bronze medal—Denver Fire Brick Co.
" Power blower, silver medal—Boston Blower Co.
" Power pressure blower, silver medal—Wilbraham Bros.
" Portable forge, bronze medal—Buffalo Forge Co.
" Hand blower, bronze medal—Buffalo Forge Co.
" Cold pressed nut, silver medal—Hoopes & Townsend.
" Display of nuts, bolts, rivets, etc., gold medal—Hoopes & Townsend.
" Copper boilers and flues, silver medal—American Tube Works.
" Seamless copper pipe, silver medal—American Tube Works.
" Seamless brass pipe, silver medal—American Tube Works.
" Elevator buckets, bronze medal—B. F. Gump.
" Rawhide belting, silver medal—Chicago Rawhide Mfg. Co.
" Cotton belting, silver medal—Gandy Belting Co.
" Boiler and pipe covering, silver medal—Shields & Brown.
" Hot pressure nut, silver medal—J. H. Sternburg.
" Seat frame, silver medal—Hale & Kilburn.
" Head linings, "wood," silver medal—Hale & Kilburn.
" Upholstering, silver medal—Hale & Kilburn.
" Berth and seat springs, silver medal—Hale & Kilburn.
" Pneumatic transfer car, bronze medal—Lyman & L. La Rue Smith.
" Differential pulley blocks, silver medal—Yale & Towne Mfg. Co.
" Pulley blocks, bronze medal—Penfield Block Co.
" Fire-extinguisher for cars, bronze medal—M. Walker.
" Eye-bars, silver medal—Keystone Bridge Co.

SUPPLEMENTAL LIST.

Lincrusta-Walton, by J. J. McGrath, agent, decorating material, silver medal.
Western Sand Blast Co., ornamental blast, bronze medal.
Highway crossing signal, J. S. McLeod, bronze medal.
Power excavator, Wilcox & Stosh, gold medal.
Best system of depot drainage, silver medal, Durham House Drainage Co.
Pig iron breakers, Blake Crushing Co., silver medal.
Screw machine, Niles Tool Works, silver medal.
Signals for railroad crossings, Union Switch & Signal Co, silver medal.
Independent Brake, Rote Automatic Brake Co., silver medal.
Station clock, P. H. Dudley, silver medal.
Exhaust pipe head, Maypole Brothers, bronze medal.
Grate bar for stationary boiler, J. C. Jones, bronze medal.
Rolling floor for railway car or street car, Eureka Rolling Floor Co., bronze medal.
Coal for locomotives, Ohio Central Railroad & Coal Co., W. C. Wyman, agent, silver medal.
Best tool steel, silver medal, Hussey, Howe & Co.
Best spring steel, silver medal, Hussey, Howe & Co.
Best steam indicator, bronze medal, Ashcroft Manufacturing Company.
Side bearing for cars, silver medal, S. B. Thompson.
Best display of car trucks, silver medal Suspension Car Truck Company.
Rubber wheels for trucks, bronze medal, Geo. P. Clark.
Best car-door bolt, bronze medal, Walter Johnson & Co.
Semi-steel boiler flues, silver medal, National Tube Works.
Grain elevator, silver medal, Wm. Watson.
Torpedo placer, bronze medal, Medcalf & Haber.
Door, window and deck glass, silver medal, G. F. Kimball.

Tests of Train Brakes.

Some successful tests of the train brakes made by the American Brake Co. of St. Louis were recently made on the Lake Erie & Western road, near Lima, O. The first trial was made on June 10, the train consisting of an engine, tender and 20 empty flat cars, the total weight of the train being 206 tons, the brakes applied to one truck of each car. The stops made were as follows:

No.	Speed, miles per hour.	Time, secs.	Distance, yards.	
1	20	40	142	30 feet down grade.
2	20	37	200	20 " " "
3	25	34	200	20 feet up grade.
4	33	48	325	Level.
5	40	60	500	20 feet down grade.
6	30	50	325	20 feet down grade, engine cut off and 3 hand brakes set at head of train.
7	30	44	330	Level, engine cut off and 2 hand brakes set at head of train.
8	28	65	366	Level, engine cut off and 1 hand brake set at head of train.
9	25	110	333	Level. 7 hand brakes applied by 3 brakemen at *rear* of train dead engine. Automatics not used.
10	30	64	375	Level, dead engine and 3 hand brakes set at head of train.
11	25	43	300	Level, backing and allowing momentum to apply brakes.
12	30	42	150	Level, backing, taking slack and working steam against brakes.

The second trial was made on June 16, with a train consisting of the engine, tender, 19 loaded cars, 1 empty car, 1 caboose and 1 passenger coach, the total weight of the train being 460 tons and its length 260 yards. The stops made were as follows:

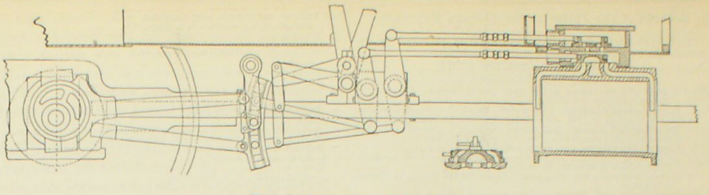
No.	Speed, miles per hour.	Time, secs.	Distance, yards.	
1	16	50	252	Down grade.
2	18	53	264	" "
3	20	62	381	Level.
4	23½	64	488	"
5	28	70	440	Down grade, engine cut off and 2 hand brakes set at head of train.
6	17	68	410	Down grade, engine cut off and 3 hand brakes set at head of train.
7	21	90	733	Down grade, engine dead, 3 hand brakes set at head of train.
8	25	105	616	Heavy down grade, *backing*. Engine took slack and worked steam against 2 hand brakes set at rear of train.

As a result of these tests the Lake Erie & Western Co. has decided to equip all its trains with this brake.

New York, West Shore & Buffalo Railway.

The first through train from Jersey City to Albany was run on the 9th of July. It arrived at its destination considerably behind time, owing to some unavoidable delay in starting, and an obstruction from freight cars that had got off the track near Catskill. The opening of this new and splendidly equipped line from New York to Albany is a marked event in our railway progress. The country adjacent to the western shore of the Hudson between Kingston and Albany has hitherto been without railway facilities, and as it is a highly cultivated region, with attractive mountain scenery and sprinkled with flourishing villages, the progress of the train was mutually enjoyed by the people along the route and the passengers on board. The great river whose precipitous mountain barriers once seemed to defy railway competition along its margin is now fairly sandwiched between two parallel rival lines which tap the resources of the vast agricultural region of the Northwest.

The route of the new line is from Weehawken, opposite the city of New York, along the west shore of the Hudson River to Albany, through the Mohawk Valley to Syracuse, Rochester and Buffalo. The ferry connections with New York will, when completed, be of the best description. The main line from New York to Buffalo is 425 miles in length and double tracked. One-third of the entire line is level, and 80 per cent. of it is straight; the maximum curves are 4°, and on only 28 miles does the curvature exceed 2°. The prevailing maximum grade is 20 feet to the mile going east, and 30 feet going west. For a short distance these limits are slightly exceeded, mainly south of Haverstraw, which is about 40 miles from Weehawken. The track is well ballasted and laid with 67-pound steel rails (Pennsylvania Railroad section) with fastenings of extra strength. The sidings will be ample, the bridges are of iron, and the culverts of the most substantial masonry. It is expected that the line will be opened to Syracuse in September, and to Buffalo by the beginning of winter.



Foster's Locomotive Valve Gear.

The cuts illustrate a locomotive valve gear designed by W. A. Foster, Assistant Supt. of Motive Power of the Fitchburg R. R. It is of the independent cut-off class and requires only four eccentrics, the same as the ordinary link motion. The link is stationary and "reversed," and has a block face 4 inches wide. Each block being only 1¾ inches wide, they readily pass from end to end of the link. In the engraving the main valve is driven by the block in the top part of the link, while the cut-off valve is driven from the block at the bottom of the link. When the cut-off valve is not required, its block is shifted to the center of link, when the main valve controls the expansion as far as its lap reaches. To reverse the engine, the main valve link block is shifted to the opposite end of link, and the cut-off valve can be used or not at the option of the engineer. The cut-off valve is as effective in the back-up as in the go-ahead motion. By the arrangement, as shown, the clearance is greatly augmented by the space in the lower chest, but by placing the cut-off valve on the back of the main valve, as shown in the small detached drawing, this disadvantage is avoided.

The advantages of this gear may be stated as follows: The main valve can be proportioned on a 22-inch stroke engine to exhaust at 20 inches at all points of cut-off. In cutting off at 6 inches by the cut-off valve, the steam will not be exhausted until the piston has traveled 20 inches. The ordinary link motion, cutting off at 6 inches, necessarily exhausts at about 13 or 14 inches, and it is evident that if the independent cut-off retains the steam 6 inches longer than the link, that amount of work is gained. Indicator cards from the two engines would show for same point of cut-off, from 20 to 30 per cent. more work from the independent cut-off than from the link. In this gear the main valve has a constant travel, and hence the seat is worn down evenly instead of hollow in the center, as is the case with the link motion.

In the arrangement shown in the small drawing, the cut-off valve travels at all times over the edges of the main valve, hence the same advantage belongs to this second valve-seat. The facing of the valves and seats would only be necessary with this gear once in two or three years, instead of once or twice a year, as with the link. The main valve at all points of cut-off fully opens the ports, and no wire-drawing occurs. The compression can be arranged to suit. With the link the construction arranges the compression and the designer's hands are tied. The full port opening does away with the necessity for long ports, and there is no need of balancing the smaller valves. There being a greater indicator card area for same point of cut-off, there is greater power developed. An engine could have smaller cylinders, presenting less surface for condensation, and still be as powerful as with the link.

New Finishing and Veneering Woods.

A correspondent of the *Northwestern Lumberman*, writing from Jacksonville, Fla., says:

"The yellow pine has for some time been well known as a very useful wood for flooring and dimension stuff, bridge and frame timber, but it is now finding its way to the eye of taste as one of the most beautiful of veneering woods. It not only presents a most beautiful surface, but admits of a very high degree of polish as well. I refer to the irregular portions when the grain is not straight; and when the convulsion causes a twisting out and in of the fiber, it is the finest thing in that line we remember to have seen in any other veneering. The color is a bright yellow, and charming from its originality. It also presents a very delightful contrast with black walnut, and any of the darker woods. It is getting to be quite an ordinary veneering in the South for such cars as are built there, and it certainly will come into general use and have an extended run elsewhere. Its merits will certainly insure it a great prominence.

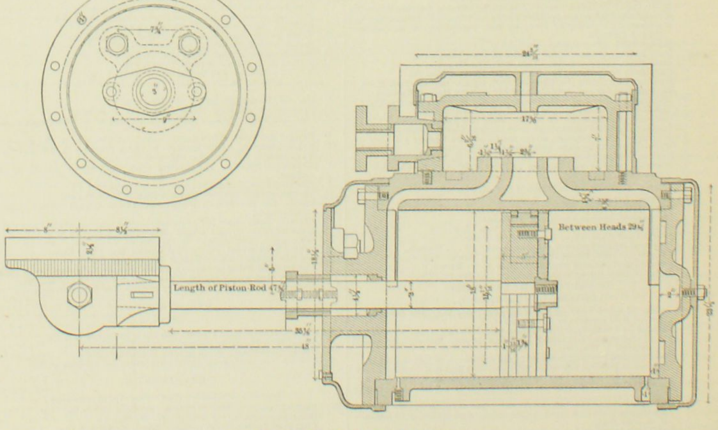
"The magnolia is a very fine finishing timber, not only on account of its inherent beauty, but likewise by reason of the extreme fineness of its grain and its susceptibility of a very high degree of polish. When it becomes known, as it surely must now, it will be in great requisition for all those uses where a high degree of polish and a close, firm texture are demanded. I see that imitation ebony is becoming much used recently. It would seem to me that the magnolia is just the species of wood to make the imitation ebony from. It seems to fulfill all the requirements, and it grows in inexhaustible quantities in the hammocks of Florida, and can be produced at very low figures.

"The red or sweet bay is another ornamental wood, which is practically inexhaustible in Florida. It is substantially the same as mahogany, and can be used in the same way and for the same purposes as the Honduras mahogany. In fact, we see no reason why it should not receive the appellation of American mahogany."

Compounded Colors on Passenger Cars.

In the early days of car painting the color chosen for the body of the car was evidently oftener a matter of convenience, accident or chance than the intelligent selection of an experienced painter. I have often thought it strange that we have for so long a time continued to use so many and such various tones of colors that are fugitive and unadapted to a place where only the strongest and most permanent colors should be used.

The choice of a color is a matter requiring the best judgment and foresight of a painter. In selecting pigments and the quantities of each, those best calculated to give constancy of tone, opacity and density and affording simplicity in mixing should be chosen. Compounded colors requiring three, four or five different pigments to produce them are, as a rule, defective either in composition of the mixture, inconstancy of tone or uncertainty of keeping the same tone through a succession of several mixings, because what is intended for the same grade of color varies in tone and strength with the different makers and often varies in the different lots from the same makers. We fail to get the shade of color from the same quantities we had made from previous lots. We are then compelled to add to the color a substance to brighten or depress the tone that our former color did not contain, and through this kind of



CYLINDER AND PISTON.

Standard 8-Wheel Freight and Passenger Locomotive, Louisville & Nashville Railroad.

manipulation we have in a year or two several shades of color only approaching the original one. This is what painters call "our standard."

The majority of the yellow tones so commonly used on passenger cars contain too many kinds of pigments to remain constant, and do not properly assist in preserving the life of the varnish, unless the proportion of white lead predominates over the other pigments, giving them density and other non-absorbent power. The fewer pigments used to produce a color, the more thorough and homogeneous will be the mixture of the materials, and the less its liability to fade. The density of a color very materially assists a varnish in withstanding the action of water, dampness, and change of temperature. The denser a color, the longer will varnish retain its elasticity and resistance to the weather.

The color composed of the fewest number of pigments, having evenness and density of atoms, and covering power, and being easy to rematch and touch-up, is always the safest and most desirable to use; even when its tone is not so brilliant as the color composed of a greater number of soft, doubtful, and fugitive pigments.—*M. W. Stines, in Coach Painter.*

The Rules Governing the Condition of Freight Cars Interchanged in Traffic.

The following are the rules governing the condition of, and repairs to, freight cars for the interchange of traffic, as revised at the Master Car-Builders' meeting in Chicago, June 13.

RULES.

Resolved, That in voting upon the adoption of rules to govern the condition of, and repairs to, freight cars offered for interchange traffic, including payment for cars in case of their destruction, the vote of each railroad is to be governed by the number of eight-wheel freight cars the road owns, and two four-wheel cars represent one car, and that each 1,000 cars, or the major part thereof, is entitled to one vote and it shall require two-thirds of all the votes present to approve it.

RULE 1.—Each road is to *deliver* the cars to connecting roads in *good running order*, with journals, boxes and bearings in good condition, as defined by the following rules:

RULE 2.—Each road may maintain an inspector at junction stations, and refuse cars unless they are in good running order.

RULE 3.—Cars may be refused for any of the following defects:

a. Wheels cracked or broken.

b. Flat spots on wheels exceeding 2½ inches in length.

c. Flanges with flat vertical surfaces extending over ⅛ inch, from tread of wheel.

d. Flanges less than 1 inch thick.

e. Wheels chipped on the tread to a depth of more than ⅛ inch, or leaving the tread less than 3½ inches.

f. Axle journals cut, or less than 2¾ inches in diameter, and the size of journals shall be proportioned for capacity as registered on cars:

60,000	lbs. to be not less than	3¾	inches in diameter.	
50,000	" " " "	3½	"	"
60,000	" " " "	3½	"	"
40,000	" (6 axles) " "	3¼	"	"
30,000	" " " "	3	"	"
20,000	" " " "	2¾	"	"

g. Brakes not in efficient condition.

h. Brake wheels, steps, ladders or running boards not securely fastened or in bad condition.

i. Drawbars or attachments in bad order.

j. Leaky roofs on merchandise or grain cars.

k. Spliced draw sills or draw timbers.

l. Intermediate timbers or outside sills spliced in a manner not provided for in the rules.

m. The general condition of cars considered unsafe to move in heavy trains.

n. Doors in such condition as to render them unsafe as protection from fire and storms.

RULE 4.—In order to give a good dispatch to the movement of cars, the inspection by the receiving road and the repairs by the road offering the cars shall be promptly made.

RULE 5.—In case a car has defects which do not render it unsafe to proceed on its journey before being repaired, the inspectors may note such defects, and the car be accepted, subject to being received back in the same condition.

RULE 6.—In such case a card 4½ × 6½ inches, in the form shown below, may be affixed under the body of the car, for guidance of other inspectors, preferably on the inside of the cross-frame tie-timber, stating the defects with which the car will be received back, and when the car is so repaired the card shall be removed. Any company finding one of their own cars, or cars contributed by them, carded by another company, may make the repairs called for by the card and present bill for such repairs, the card to accompany the bill.

(*Name of Road.*)

Car No........................ Date........................

Initial........................ Line........................

Will be received at any point on this company's line, with the following defects:

....

....

....

..............................Inspector at..............................

RULE 7.—In case the receiving and delivering inspectors disagree as to the condition of the car, the case is to be immediately referred to their superior officers.

RULE 8.—Every effort shall be made to cause the least possible hindrance to the dispatch of traffic in the inspection of cars, and the settlement of any disagreement arising thereunder.

RULE 9.—Each road shall give to foreign cars while on its line the same care as to *repairs, oiling* and *packing* that it gives to its own cars, and shall return them in as good general condition as they were when received. If this be not done, the car may be refused upon its return until it is repaired or until the company which has used it agrees to pay the expense necessary to restore it to such general condition. Locks are not to be considered a part of the proper equipment of a car, and if left on the cars when offered to foreign roads it will be at the risk of the owner.

RULE 10.—Wheels and axles used to replace those broken or worn out under fair usage will be charged to the company owning the car.

Wheels with flat spots exceeding 2½ inches in length or diameter, or flanges with flat vertical surface extending more than ⅛ of an inch from the tread of wheel, or less than one inch thick, shall be considered wornout wheels.

Wheels flatted by sliding or wheels having treads or flanges chipped, or broken flanges, are not to be considered as worn out under fair usage, and such wheels shall be replaced by the company sliding or chipping them, at their own expense. The condition of each wheel removed must be noted on all bills.

RULE 11.—Prices for wheels and axles furnished shall be as follows:

One new 36-inch wheel (less old) on same axle	$11
Two " " " " " " "	21
One " 33-inch " " " " "	8
Two " " " " " " "	16
One " 30-inch " " " " "	6
Two " " " " " " "	12
One axle turned and fitted (less old)	8
Second-hand wheels (less old) per wheel or per pair	2
Loose wheels refitted on second-hand axle per wheel or per pair	2

When only one wheel is put on an axle, it must be of the same circumference as the other wheel on the same axle.

Prick-punching the wheel seat or shimming the wheel shall, under no circumstances, be allowed.

RULE 12.—One railroad company rendering a bill against another for wheels or axles *shall note on the bill* a full and exact description of the mode and manner of its failure, name of manufacturer, the date and all shop marks as found on such wheel or axle removed, as well as the owner, number, class and line of cars from under which they were taken, and date of removal. They shall mark on the inside hub of the wheel substituted the date of its application. Bills may be declined until the above information is fully furnished. If no marks or dates are found on wheels or axles removed, a notation to that effect must be stated on bill.

The following terms shall be used on the bills for wheels and axles in noting the defects of wheels that have failed under fair usage:

Worn Flat.—Where the flat spot or spots exceeds 2½ in. in length or diameter. Care must be taken to distinguish this defect from "slid flat."

Worn Flange.—Where the flange is less than 1 in. thick or has flat vertical surfaces extending more than ⅛ in. from the tread of the wheels.

Cracked Plate.—This term is to be used in reporting all cracks that may occur in the plate, other than those extending from the wheel-fit toward the rim, caused by bursting. In the report the length of the crack must be given.

Cracked Brackets.—The number of brackets cracked must be stated in the report.

Shelled Out.—This term is to be applied to wheels which become rough from circular pieces shelling out of the tread, leaving a rounded flat spot, deepest at the edge, with a raised center. No wheel must be condemned for this fault unless the spots are over 2½ in. in length, or their number is so great as to interfere with the safe running of the wheel.

RULE 13.—If an accepted foreign car is injured upon a road it shall be repaired by and at the expense of the company in possession thereof as promptly as it repairs its own cars.

Such repairs shall be permanently and thoroughly made, and shall conform to design in detail of the original construction (provided the same can be determined from the car itself), and with the same form, kind and quality of material originally employed.

The companies may, however, agree with each other to substitute for broken parts new standards, such as the axle bearing and box adopted by the Master Car-Builders, improved drawbars, etc.

RULE 14.—Sills broken or materially injured must be replaced by new ones of the same size and of good quality, an exception to be made of intermediate and outside sills to which the draw timbers are not attached, which, if broken between bolster and endsill only, may be spliced with a "ship splice" of 24 inches in length, and secured by three ⅝-inch bolts, all to be done in a workmanlike manner.

RULE 15.—Any company departing from the above rules without authority shall be liable for the cost of changing the car again to the original standard. The car may be refused until the changes are made, or an agreement entered into to send it to the owner for such alterations, in which case proper credit shall be given for the material removed.

RULE 16.—Companies shall promptly furnish to each other, upon requisition, and forward free over their own road standard materials for the repairs of their cars injured on foreign lines. In such cases the following prices may be charged:

a. Iron castings, 2¼ cents per pound.

b. Brass journal bearings, 20 cents per pound.

c. Malleable iron, 6 cents per pound.

d. Phosphor-bronze bearings, 25 cents per pound.

RULE 17.—When either car trucks or bodies are destroyed on a foreign road, the owners must be notified immediately, that a settlement may be speedily effected.

The company destroying the same shall have its option whether to rebuild it or pay for the same at the established price.

If it elects to pay for it, a deduction shall be made by the owner for the depreciation of the car, truck or body, at the rate of 6 per cent. per annum upon the yearly depreciated value of the parts destroyed since last built. Provided, however, that such allowance shall in no case exceed 60 per cent. of the established price.

Until further revision of these rules the prices for settlement under this rule shall be as follows:

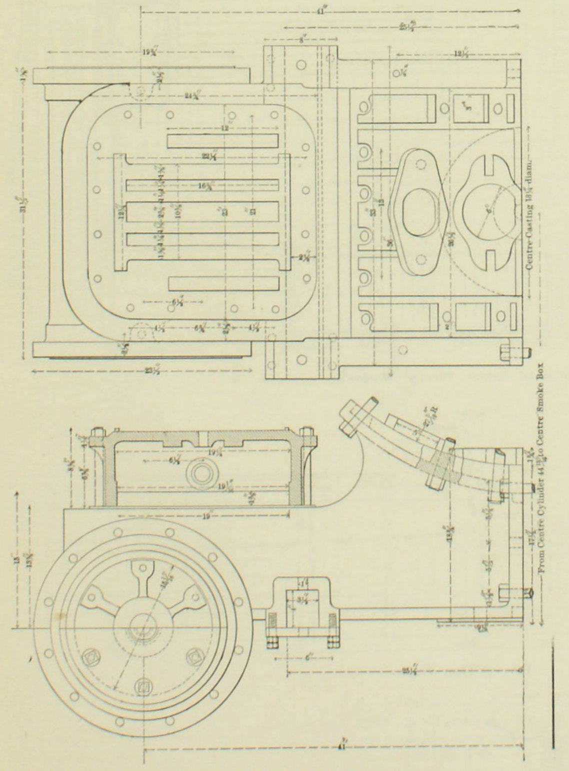
Eight wheel	box car, 32 to 35 ft. long	$520
"	" 32 ft. long or under	500
"	cattle car, 32 ft. long or over	520
"	ordinary stock car, 32 ft. long or under	490
"	gondola car, 20 ton drop bottom	450
"	gondola coal car, 20 ton hopper bottom	525
"	gondola 31 ft. long or over	400
"	ordinary gondola car, less than 31 ft	375
"	flat car, 31 ft. long or over	360
"	flat car, under 31 ft	350
Four wheel	gondola car, with truck and drop bottom	325
"	box car	250
"	ordinary coal car	225
One pair 4 wheel trucks		230

RULE 18.—If the company destroying the car elects to rebuild it, no allowance shall be made for betterment. In such case the car, truck or body shall be rebuilt by, and at the expense of, the road destroying it, upon the same plan and of the same kind and quality of materials as originally constructed, within sixty days.

RULE 19.—Any railroad company may become a party to these rules by giving notice of its adhesion through its General Manager or Superintendent to the President of the Master Car-Builders' Association. Each company may withdraw from its participation in these rules by giving 30 days' notice to other roads through a general circular.

RULE 20.—These rules shall take effect on and after Aug. 1, 1883, and be introduced for discussion and revision during one session of the Master Car-Builders' Convention each year.

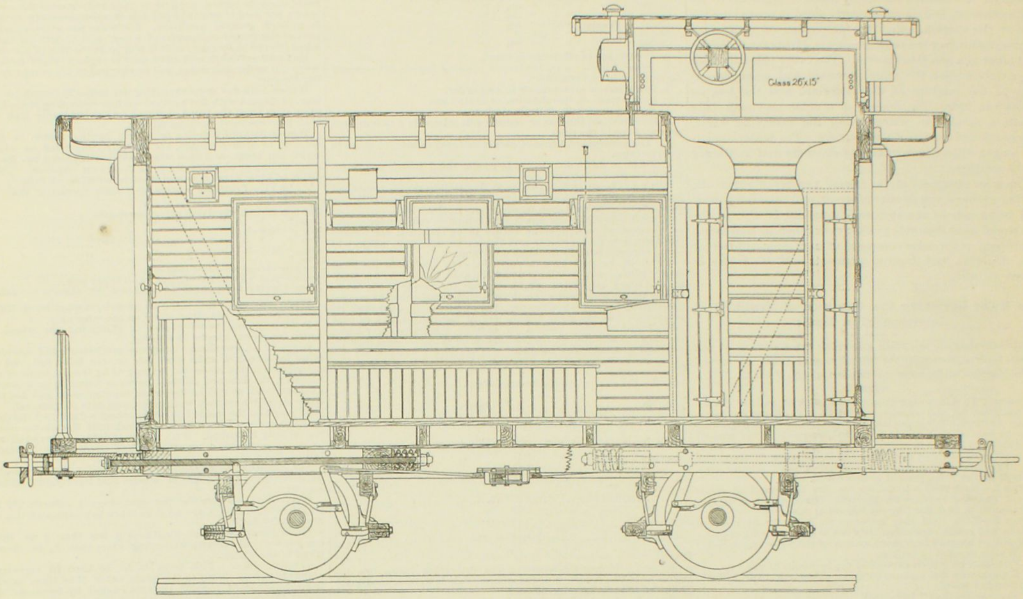
RULE 21.—Upon application of the roads representing one-third of the whole number of cars in interest, it shall be the duty of the President to call a meeting for the revision of these rules, between Aug. 1, 1883, and Aug. 1, 1884.



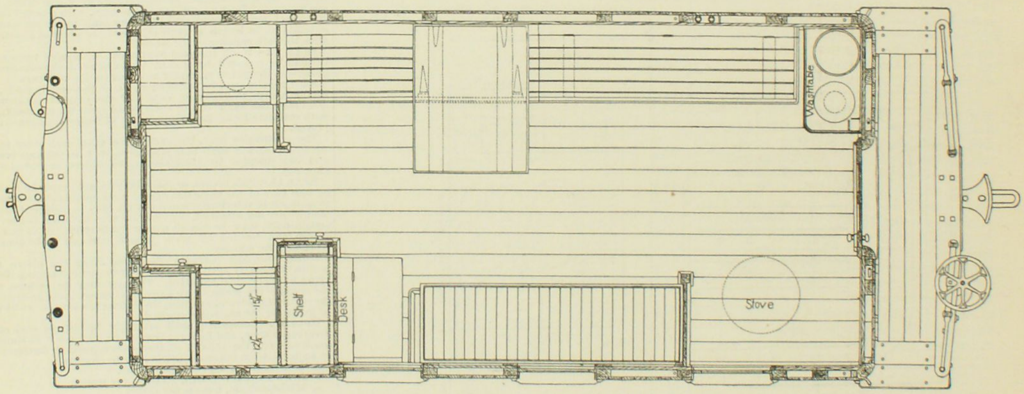
CYLINDER AND PISTON.

Standard 8-Wheel Freight and Passenger Locomotive, Louisville & Nashville Railroad. (*See* CAR-BUILDER, *March and April*, 1883.)

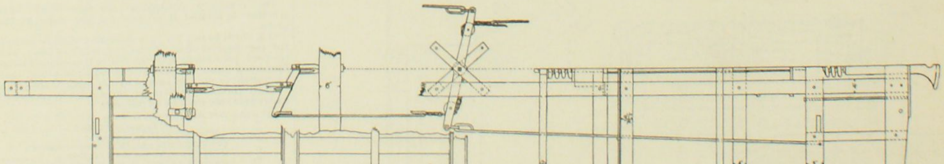
STANDARD FOUR-WHEEL CONDUCTOR'S CAR—NEW YORK CENTRAL & HUDSON RIVER RAILROAD.


Glass 26"x15"

Longitudinal Section.


Washtable
Shelf
Desk
Stove

Horizontal Section Through Windows.



Plan of Floor Frame.

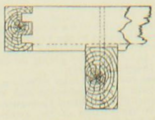


Fig. 1.

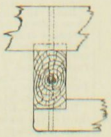


Fig. 2.

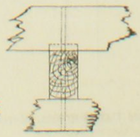


Fig. 3.

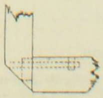


Fig. 4.

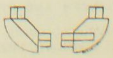


Fig. 5.

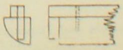
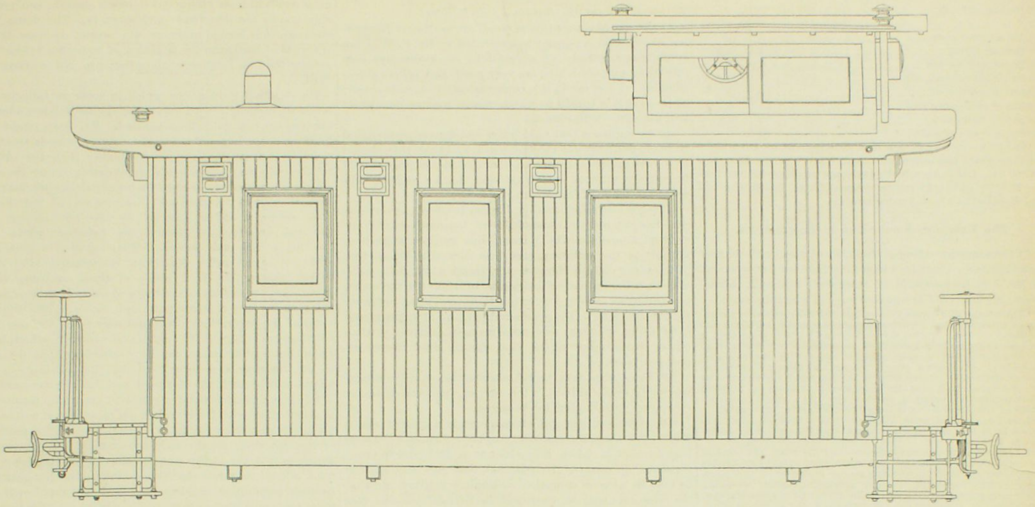
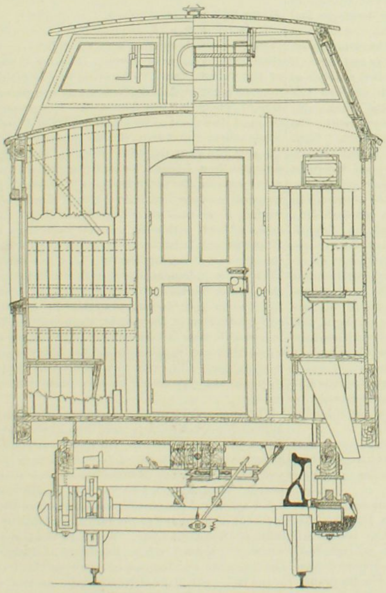


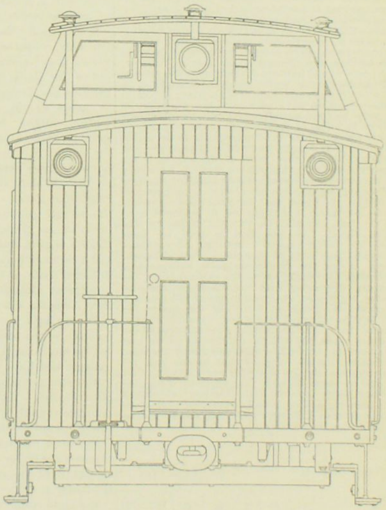
Fig. 6.



Side Elevation.



Transverse Vertical Section.



End Elevation.

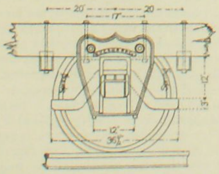


Fig. 7.

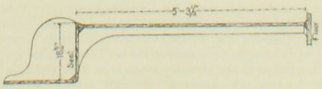


Fig. 8.

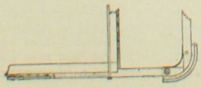


Fig. 9.

Fig. 1.—Side sill, floor cross timber and wheel piece.
Fig. 2.—End sill, wheel piece and end rail.
Fig. 3.—End sill, center timber and end rail.
Fig. 4.—Side and end sill.
Fig. 5.—Top and bottom of corner post.
Fig. 6.—Door post.
Fig. 7.—Part elevation of running gear.
Fig. 8.—Section of dome seat opposite closet.
Fig. 9.—Sectional plan of plates and end carline.

GENERAL DIMENSIONS.

Length over end sills	17 ft.	4½ in.
Width over side sills	8 "	6 "
Height, bottom of sill to top of dome	10 "	2⅛ "
Height, bottom of sill to top of plate	7 "	3½ "
Height of door opening	6 "	1½ "
Width of door opening	2 "	2 "
Window openings between inside of posts		22½ "
Distances between centers of windows	4 "	1¼ "

SIZES OF TIMBERS, ETC.

2 Wheel pieces, white oak	4½ ×	9½ in. ×	21 ft.	2½ in.
4 Cross rails, "	4 ×	5½ " ×	6 "	7¼ "
4 Buffer timbers, "	6½ ×	8 " ×		10½ "
2 Side sills, Georgia pine	4 ×	6½ " ×	17 "	4½ "
2 Center timbers, "	4 ×	8 " ×	21 "	6½ "
2 Side plates, "	2¾ ×	6 " ×	18 "	0 "
4 Draw-bar timbers "	2½ ×	6½ " ×	4 "	6¼ "
2 End sills, white oak	5 ×	6½ " ×	8 "	1¼ "
3 Cross floor timbers, white oak	3½ ×	6½ " ×	8 "	1¼ "
4 " " "	2 ×	5½ " ×	8 "	1¼ "
2 Platform end timbers, "	4 ×	7 " ×	8 "	5½ "
4 Platform supports, "	2½ ×	10¼ " ×	2 "	5¾ "
2 End plates, "	2½ ×	13½ " ×	8 "	6 "
8 Carlines, "	1¾ ×	3 " ×	8 "	6 "
2 End carlines, "	2½ ×	3⅝ " ×	8 "	6 "
4 Corner posts, ash	5 ×	5 " ×	6 "	11 "
4 Door posts, "	3¾ ×	3¾ " ×	6 "	6½ "
14 Side posts, white oak	2 ×	4 " ×	6 "	6 "
4 Side braces, "	2 ×	4 " ×	6 "	11 "
4 End braces, "	2 ×	4 " ×	6 "	7 "

4 Brake beams, white oak	4 × 6 in.	× 5 ft.	9 in.
4 Roof projection arms, ash	2½ × 6 "	× 3 "	3 "
2 Bottom side rails, Ga. pine	2½ × 7 "	× 5 "	4¾ "
2 Top " "	2½ × 5½ "	× 5 "	4¾ "
2 Bottom end rails, "	2½ × 6¾ "	× 8 "	0 "
2 Top " "	2½ × 5¼ "	× 6 "	4½ "
4 dome corner posts, "	4 × 4 "	× 2 "	10 "
2 Division strips, "	1½ × 3 "	× 1 "	9⅛ "
3 Dome carlines, ash	1½ × 2¼ "	× 7 "	0 "
2 End dome carlines, ash	1 × 1½ "	× 7 "	0 "
Radius of main roof		15 "	9 "
Radius of clear-story roof		18 "	6¼ "
Height of clear-story		2 "	3¼ "
Center to center of axles		10 "	0 "

Wheels to weigh not less than 525 lbs., to be guaranteed for three years, and pressed on axle at a pressure not less than 60,000 lbs. Car to have Hoit's double-spring draw-bar and buffer, M. C. B. standard axles and journal boxes, Hewitt box lids and Hopkins' lead-lined journal bearings.

The Extended Smoke-Box in Locomotives.

At the annual meeting of the Railway Master Mechanics' Association, in Chicago, a paper on this subject was read by Mr. J. S. Patterson, M. of M. of the Cincinnati, Indianapolis, St. Louis & Chicago Railway, in which he says:

"I now have 21 locomotives equipped with the extended smoke-box or spark arrester, 13 being in passenger and 8 in freight and switching service. During the past two and a half years that it has been in use no fires have been reported on the line of road and blame attached to any engine equipped with the extended smoke-box. We have a much cleaner and pleasanter train, as most of the sparks are deposited in the extended smoke-box and not hammered back over train to annoy passengers, injuring newly-painted or varnished coaches, etc. As a rule a train consisting of from four to six ordinary coaches and a fair quality of coal, such as is used upon Western roads, the locomotive will deposit from 40 to 50 bushels of sparks into the extended smoke-box in 100 miles' run. This of itself is appreciated by the passengers and quite an advertisement for the road. In point of economy there is a saving of fuel, but to what extent I am unable to state, but certainly some, since we can use from ¼ to ½ inch larger exhaust openings, thereby gaining a better steaming engine, and consequently a saving in fuel. Mr. James Meehan, general master mechanic Cin., N Orleans & Texas Pacific Railway, claims a 20 per cent. saving in fuel compared to the old diamond stack and lift pipe. Mr. Meehan, in connection with the extended smoke-box, also uses the brick arch in fire-box I find quite a saving in netting, cones, smoke-stacks, etc., as these several parts used with the extended smoke-box will last about as long as any other part of the box or boiler, there being no hammering of sparks to wear them out. We, of course, have a more free working engine, owing to the large exhaust openings. This is accomplished by using the high exhaust pipes and diaphragm plate, which reverse the draught upon the fire, through the top flues first, instead of the bottom, therefore we obtain a more general and uniform draught upon the fire and the benefit of all the flues in the boiler, which is impossible with the low exhaust and lift pipe, as a number of the lower or bottom flues are as a rule stopped up by cinders, etc., also a number on each side of the boiler had just as well be, for all the advantage that is derived from them but of slight benefit to the steaming of the engine. In my opinion there is no question as to the merits of the extended smoke-box, straight stack, high exhaust and diaphragm plate, but it is like all other parts of the engine, if the work is not properly done the engine will not do well. I am very sure that roads that have tried the extended smoke-box and pronounced it a failure had it applied to their boilers in an improper manner. It is highly important that both the smoke and extended arches be as near air tight as it is possible to make them; in fact, should be as air tight as the boiler is steam tight. If attention is paid to their construction and the work properly executed, they cannot fail to be a success and improvement over the old diamond stack, cone and netting. I find the diaphragm plate indispensable with the high exhaust. In cutting down the exhaust below the top row of flues and dispensing with the diaphragm plate by using a perforated spark-pipe, as shown in one of the prints, I experienced considerable trouble in throwing the sparks far enough forward in the extended smoke-box, consequently the sparks accumulated too near the bottom flues and around the bottom of the steam pipes, but with the diaphragm plates and high exhaust they are thrown well forward and out of the way. Mr. Meehan informs me that his company paid in last year for fires on their Lexington division $30,000, when using the old diamond stack, and on same division this year, by using the extended smoke-box, there were no fires. I annex a statement from Mr. Meehan showing saving in fuel of different engines on the Cincinnati, New Orleans & Texas Pacific Railway by the use of the extended smoke-box and brick arch in fire-box as against the old diamond stack."

	WITHOUT EXTENDED SMOKE-BOX. 1882.					WITH EXTENDED SMOKE-BOX. 1883.			
No. OF ENGINE.	Size of cylinders...	Mileage.........	Service.	Coal consumed...	Pounds per mile...	Mileage.........	Coal consumed ...	Pounds per mile...	Saving in favor of the extended smoke-box......
9......	16×24	5,192	Pass.	2,860	44	4,430	1,860	34	10
45......	17×24	5,032	Pass.	4,020	64	4,756	2,625	44	20
38......	18×24	2,018	Freight	2,465	98	2,492	2,050	66	32
17......	17×24	2,649	Freight......	2,982	90	2,291	1,825	64	26
21......	17×24	2,370	Freight......	2,800	95	2,418	1,625	54	41
27......	17×24	5,143	Pass.	4,345	68	5,310	3,175	48	20
43......	18×24	2,858	Freight......	3,045	85	2,485	2,075	67	18
46......	17×24	4,749	Pass.	4,282	72	4,756	2,875	48	24

IT is expected that the passenger cars of the East River Bridge will be ready for running by about the middle of August.

A LARGE number of Italian workmen are employed on the New York, West Shore & Buffalo Railway. Finding it impossible to keep track of the men by their jaw-breaking names, the contractors concluded to number them. The number of each Italian is painted in plain figures on the seat of his pantaloons. Before beginning work in the morning and at noon, and again at night, the men are formed in line, and the foreman passes in the rear of them and takes down each number, in order to ascertain who is present as well as who is absent. The plan is beneficial in two ways—the men are easily recognized, and they are also kept from sitting down too much for fear of rubbing out the figures.

Communications.

English and American Locomotives.

To the Editor of the National Car-Builder:

At the recent convention of the Railway Master Mechanics' Association, a paper was presented by Mr. F. W. Dean containing a variety of suggestions on locomotive construction, some of which are very good and others objectionable. I propose in this communication to notice some of the points in regard to which many master mechanics will not agree with him.

He recommends that sand-boxes and dome-covers should be made perfectly smooth and plain, and that they should have hemispherical tops; also, that cylinder casings should be entirely without moldings, and that locomotive cabs should be made of iron instead of wood.

If *cost* is any consideration, it must be clear to every one who has any practical knowledge of locomotives, that the style of dome-covers he recommends can not be made as cheaply as the ordinary cast iron ones with Russia iron jackets; nor can any thing be more inexpensive and serviceable than the ordinary Russia iron covering for the bodies of cylinders. As for iron cabs, there can be no necessity for them so long as the accidental burning of wooden ones is an event of such rare occurrence that not more than one or two instances of the kind can be cited within the past ten years.

Mr. Dean also says that American locomotives are remarkably wasteful both in the use of fuel and steam, as compared with English locomotives.

This statement has on its face a certain degree of plausibility, but when the amount of work performed by American engines is taken into account, it is found to be erroneous. It can not be expected that our engines can be kept in as good condition as English engines, nor that the same care will be exercised in firing, from the fact that the former have to make twice as much mileage, and haul heavier loads. The demand for power is greater, and economy in fuel is a matter of secondary importance. The great aim is to keep the freight moving. The necessities of transportation outweigh all other considerations, and our engines are therefore always overloaded and have to run slow, with the reverse lever at full stroke or nearly so, giving heavy exhausts which tear up the fire and throw it out of the stack, causing waste. But if the number of engines per freight ton per mile in this country was as great as on English roads, then the same attention might be paid to fuel economy with the same results as are reached in England. With the same care in firing, lighter loads, higher speeds allowing more expansive use of steam, any good American engine will show the same results as Mr. Dean claims for English engines. There is, in fact, the same difference in the service performed, care and attention received, etc., between an American freight engine and an English freight engine, that there is between a heavy dray horse and a carriage horse. The former works long hours on indifferent roads, is frequently overloaded, and receives but indifferent attention. The latter has little to do, hauls light loads for a few hours, and as the demand for his services are light, the strain on his system is also light, and he has also the best of food and grooming. If an American engine hauled as light a load and could use a less violent exhaust and burn as good coal, then the amount of water evaporated per pound of coal would equal that of the English engine. But until these facts are understood by Americans (and by Mr. Dean) they may go on thinking that England builds better engines than we do.

Mr. Dean further says that the only rigid connection between the boiler and the frame of American locomotives should be at the smoke-box, leaving the boiler to rest on the frame and choose its position.

The rigid connection *is* already at the front end, and the boiler *is* already free to adjust itself, and it is rather surprising that Mr. Dean did not know it. Our boilers are bolted to the cylinder saddles. There are no rigid connections back of this. The fire-box end is supported by a loop of iron bolted to the fire-box and sliding on the frame. From the back head of the boiler two braces extend to the back end of the frames, but the foot of these braces have slotted holes to allow of any expansion. A few builders put a brace between the shell of boiler and the frame near the guide-yoke, but these are generally slotted where they bear on the frame, making an adjustable joint there. Others leave this brace off entirely, while others carry an extension of the guide-yoke up to the boiler and bolt it. But as in this style the brace is so near the front and cooler end, any expansion occurring between it and the cylinder saddles is so small as not to need taking care of, and so the very condition of affairs which Mr. Dean thinks is necessary is found in nine out of ten of our engines.

Mr. Dean recommends the use of butt joints, and the reaming of rivet holes to size after the plates are in place.

Butt joints are a good thing, but not necessary. The necessity of reaming holes is not very apparent, as the boiler-makers of our leading shops will lay off the sheet and punch them so true that little or no "blindness" occurs. The placing of the fire-box stay-bolts farther apart, as Mr. Dean recommends, is bad practice, for the reason that stay-bolts will break, and when they do, their portion of the load must be borne by the adjacent stays, and if the distance between them is increased, and one breaks, the load on the others is so much heavier, which must result in their giving out so much sooner, and probably end by the side-sheet being blown in. The dome on our engines is needed to secure dry steam, because they are worked hard, and the tendency of water to "raise" is greater than on English engines that are not worked so hard.

The idea that the four-bar guide is weak is fallacious, when we find high speed automatic engine builders adopting it as the best guide they can find. Mr. Dean ought to know that it is impossible for the driving wheels on the same shaft of an engine to get one higher than the other relatively to the engine, to any great extent, unless the engine has considerable lost motion in the driving-box flanges and oil cellars; and what little action of this kind does occur is taken care of by the lost motion in the rod brasses, and hence no twisting action on the main rod can occur. Many master mechanics will not agree with Mr. Dean in strengthening the rocker shafts. In fact, many of them are using cast iron rockers in order to have them weaker, so that if any thing works into a steam port and obstructs the movement of the valve, the rocker-shaft may break and not the valve-seat or bridges. The extra grate surface, which Mr. Dean thinks so desirable, can be obtained without the use of the Joy gear, as it is evident that the fire-box can be lengthened beneath the forward and back driving axles. While it is clear that the Joy gear will give equal results as to distribution with the link, it is not clear that it will have the life of the link motion. The sliding, wedging motion of the Joy block in the radius-piece must produce rapid wear—in fact, the writer was informed by an English railroad official that the objection found to the Joy gear by English locomotive builders was that the rapid wear of these parts was such as to make it doubtful whether it was suitable for locomotive work.

FRANKLYN.

The Capacity, Construction and Speed of Freight Cars.

To the Editor of the National Car-Builder:

It is no matter of surprise that car-builders and road managers are becoming very much interested as to what shall be the maximum carrying capacity of the freight car of the future, for it is manifest that something must be done to accommodate the constantly increasing volume of freight demanding transportation. It is proposed by some to meet the demand by building cars of 30 tons capacity, while others think that 40 tons capacity is not too much. To give the cars requisite strength, it is suggested that wrought iron I-beams be used for sills, and put together in a way similar to tender-frames; others think fast running will meet the case, but the greater number are probably waiting to see what their neighbors will do. Since the increase of loads within the past few years from 10 and 12 to 15 and 20 tons, it has been apparent to most railroad men that the cost of repairs has increased in a marked degree. This in my judgment has been due to two causes. First, the greater inertia of the car and load, or, in other words, the heavier jerk necessary to start the car from a standstill; and secondly, the greater strain cars are subjected to in general usage in consequence of the longer and heavier trains that are required to load the heavy type of engines now in use. Although cars have been built stronger, they are not yet strong enough to carry 25 tons in long trains.

If I-beams and a much larger quantity of iron are employed in their construction, it is more than likely that a very ugly snag will be encountered. The master mechanics of roads using wrought iron tender-frames know how very expensive it is to repair one of these frames after it has been in a wreck. To straighten a frame, it is usually necessary to cut it apart, and the heating and hammering draw the rivet holes out of shape and necessitate a great deal of reaming to bring the holes fair again. Not more than one tender is wrecked or injured where hundreds of freight cars are, and it is plain that the cost of repairing the iron framing of the latter would greatly exceed the present cost of repairs. In fact, I very much question whether car-builders, accustomed to build and repair wooden cars only, can appreciate the difficulty they would have in straightening and putting in order the usual proportion of wrecked cars if they all had I-beam sills. A prominent master mechanic and car-builder said to the writer not long ago, that he had used wrought iron tender-frames, but would prefer white oak to iron, even if it cost $50 a thousand, and as for freight car sills, he would not think of using iron so long as oak could be had at less than $100 a thousand.

In regard to the speed of freight trains, it may be interesting to know that Mr. P. H. Dudley found by a series of tests with his dynograph car, that slow and heavy freight trains wore out the rails more quickly than fast trains did, or, in other words, that fast running trains jumped over the low joints and bad spots, while with a slow train every wheel drops from the end of one rail to the next with a hammering force that tells both upon rail and cars. It is well known that passenger cars, although heavier than freight cars, and running at twice the speed, require nothing like the same proportional amount of repairing. A passenger car is of course better built and cared for, but it is at the same time longer, heavier, and runs faster. Fast running is generally believed to be destructive cars, but it would seem from the experiments referred to, as well as from the longer life of passenger cars, that slow speeds, with heavy loads, may be after all more destructive than higher speeds with the same on lighter loads. It has been shown by Mr. Dudley that a speed of eighteen or twenty miles an hour is more economical in the matter of fuel than a speed of twelve miles an hour, so that the final solution of the question, all things considered, is likely to be found in higher speeds instead of heavier loads. Theory has pointed to heavier loads, longer trains and more powerful engines, and this has been followed out in practice, but the results do not confirm the correctness of the theory when the cost of repairs to cars and track is taken into account.

W.

Reply to "The Engineer."

To the Editor of the National Car-Builder:

Your last issue contains in its editorial columns a brief reply to the criticisms of the London *Engineer* of my communication to the CAR-BUILDER for May. I desire to add a little to your reply by way of self-vindication, and in order to do entire justice to my critic, I quote from his article as follows:

> "There is no species of argument that can be used which will prove that an engine with 17 by 24 cylinders and 1,100 square feet of heating surface could run a train of 460 tons at the speed of an English express. The resistance of such a train and engine on the level can not be less than 25 lbs. per ton at 50 miles an hour. The total resistance would therefore be 11,500 lbs., but the pull of the engine would be very nearly 116 lbs. per lb. of average cylinder pressure, and $\frac{11,500}{116} = 90.1$ lbs., say 100 lbs. We need not stop to point out that no locomotive has ever been built which could maintain an average pressure of 100 lbs. on the piston at 50 miles an hour; one-half this would be excellent work. We can put the facts in another way. A speed of 50 miles an hour means 4,400 ft. per minute, and $\frac{4,400 \times 11,500}{33,000} = 1,533$ I. H. P. The Great Britain broad-gauge engine, with over 2,200 square feet of beating surface, 18-in. cylinders and 24-in. stroke, has indicated 900 H. P., and this is about the maximum effort of which a locomotive is capable. To ask us to believe that an American engine, with half the heating surface, can do nearly double the work, is to draw too heavy a draught on our credulity. Again, it may be pointed out that such an engine as that of which we speak could not develop an indicated horse-power for less than 4 lbs. of coal per hour, because the steam could not be used expansively. Consequently the engine must burn coal at the rate of 6,000 lbs. per hour, or at the rate of 120 lbs. per mile. We never heard of a consumption like this being reached in the United States. One-half as much is regarded even there as too great; one-third more than suffices an English express locomotive, with fifteen or sixteen coaches."

The engine to which I referred in my former communication had either 18 × 26 or 19 × 26 cylinders, a heating surface from 1,200 to 1,300 square feet, and a gauge pressure ranging from 150 to 160 lbs. per square inch. The average speed of American express trains is from 35 to 40 miles an hour. That of the London, Sheffield & Edinburg express is 41 miles, the London, Salisbury & Plymouth 37 miles, the London, Bristol & Portsmouth 36 miles, and the London, Sittingbourn & Dover 43½ miles, according to their respective time schedules. The resistance per ton of American express trains at an average speed of 35 miles an hour is nearer 13 lbs. than any other figure, as has been proved by demonstration. The total resistance therefore on a basis of 400 tons (a fair average weight of train) is 5,200 lbs., the pull of engine 142 lbs. per pound of pressure on piston, and $\frac{5200}{142} = 37$ lbs. nearly. Almost any engine can maintain this amount of average cylinder pressure at a speed of 35 or 40 miles an hour. But to put the facts in another way: A speed of 35 miles an hour means 3,080 feet per minute, and $\frac{3080 \times 5200}{33,000} = 485$ H. P. Taking the *Engineer's* allowance of 4 lbs. of coal per h. p. per hour, we have 1,940 lbs. burned per hour, or 55 lbs. per mile. The weight and capacity of English coaches, as stated by me, were obtained directly from an English railway official and can be relied on.

The statement of the performance of a 17×24 engine on the Kentucky Central road, showing consumption of 29.25 lbs. coal per mile with a train of from four to six cars, to which the writer in the *Engineer* refers with such an air of triumph, will not avail him, for the reason that that is a country road with a local traffic and only 20 engines, while my representations were based on the performance of engines on main trunk lines with an equipment of from 600 to 1,200 engines.

I am free to admit that I have much to learn in regard to locomotive economy, construction and operation, but the *Engineer* is certainly a passenger in the same boat, or it would not be so wide of the mark in its figures and assertions.

YANKEE.

Train Resistance.

To the Editor of the National Car-Builder:

The subject of train resistance is one which interests every railway official, but it must be admitted that very little positive knowledge exists at present in regard to it. The old and generally accepted theory that the resistance increases with the square of the velocity has to a great extent been proved to be fallacious. Until Mr. P. H. Dudley, an American civil engineer, undertook the solution of the problem, all that had been accomplished in that direction either in this country or in Europe amounted to very little.

A few years ago Mr. Dudley with his dynagraph car made a series of tests on the Lake Shore & Michigan Southern road. This road, from Cleveland to Erie, is practically a straight line, with very light grades of a maximum of only 16 feet to the mile. Experimenting with a stock train of 709 tons of 2,000 pounds, at a speed of from 16 to 18 miles an hour, the resistance was from 6½ to 7 pounds per ton. The wheels of the train were 33 inches in diameter, and the axle journals 2¾x5½ and 3¼x5½ inches. With respect to lubrication, the cars were reported to be all right by the inspectors, but a fresh supply of oil was put in the boxes by direction of Mr. Dudley, which lessened the amount of power required to haul them from 10 to 20 per cent. He also found in his extensive experiments that the cars of Eastern roads, used in the transportation of coal, weighed from 50 to 55 per cent. of the load carried, while Western cars weighed from 80 to 95 per cent. of their loads, and it is seldom that coal is transported at the West upon any other than what is practically a 28 or 30-foot flat car with 24 to 36 inch sides.

It has long been believed that freight trains can be run at a speed of from 6 to 12 miles per hour cheaper than at a higher speed. This does not appear to be true. It has been found practically that the resistance of the air is of no special consequence up to a speed of from 18 to 20 miles per hour, while at some points above the latter speed the resistance increases as the square of the speed, and at very high speed even this ratio is exceeded. The experiments of Mr. Dudley demonstrated that freight trains of from 700 to 750 tons could be pulled cheaper at from 18 to 20 miles per hour than at 12 miles. These experiments, as will be remembered, consisted of hauling a train of 709 tons at 20 miles per hour and repeating the experiment with a train of the same weight at the rate of 12 miles per hour. It was, however, several degrees colder on the day of the latter trial, but the difference in fuel burned by the engine on the 20-mile train (which was about 1,500 pounds less than on the 12-mile train) could not be accounted for by the slight difference in temperature. On examination it appears very reasonable that the above should be true. If the resistance of the atmosphere does not practically increase from 12 to 20 miles per hour, as is stated, and the axle friction remains the same (which is also believed to be true), then it is apparent to every man who ever ran an engine, that it is the *slow*, heavy pull, with the reverse lever down near to *full* stroke, which pulls up the fire, drags it through the flues and throws it in unburnt chunks out of the stack, in connection with the fact that at slow speeds it is necessary to run with the reverse lever nearer full stroke than at higher speeds, thus losing the gain of the expansion due to the closer working of the lever, which accounts for the difference in favor of the higher speeds of 18 or 20 miles per hour.

From the above it appears that a time-table could be made out for different roads, by which they could transport freight much cheaper than at present; that is, that a regular, steady speed is *not* an economical one unless the track is level and straight, for it is evident that on the level, when from 20 to 30 miles per hour can be made with the reverse lever at from 12 to 14 inches, that power, work, or momentum, as it may be termed, may be cheaply and economically stored up in the train to be given out on a hill; that is, the previously acquired momentum, on the level, will be sufficient to carry the train up or over many grades, without dropping the reverse lever, and thus using a less economical grade of expansion, and pulling up the fire by heavy and slow exhausts.

As this subject can not be fully examined in a single article without encroaching too much on your space, I reserve what I have to say further until your next issue.

F. S.

The Chicago Exposition—A few After-thoughts.

To the Editor of the National Car-Builder:

Now that the great show is over, a little speculation as to the probable results may not be unprofitable. Although there may be another show in a few years of a similar kind, it is not as yet any thing more than a probability, and it behooves us all to derive as much benefit as we can from the one that has just closed. The exposition was in one sense a school at which knowledge in railway science could be acquired by all classes, from the novice to the expert. While a large number of visitors were there merely to satisfy a lively curiosity a large majority came to see what had already been accomplished in railway progress, and to gather a stock of ideas in reference to the possibilities of the future. It is hardly to be expected that the next fifty years will witness an improvement corresponding with that of the same period in the past.

Unless some new motive power shall be discovered it is not likely that any very radical improvements will be made in locomotives very soon. Steam is sure to hold the fort for a good while yet, especially if means are devised for a more economical consumption of fuel. Perhaps the most desirable change would be a return to the 8-wheel inside connected American type of engine. At the present rate of increase in weight the "mastodons" will soon reach 100 tons, one of them being equal to four of the 8-wheel type of 25 years ago.

It is probable that inventors as a class will be very much benefited by the exposition, especially those who were exhibitors. They will have learned something in regard to the practical nature of railway appliances, that working-models are, as a rule, the most deceptive things in the world, and that the forces which work the destruction of cars, engines and their numerous attachments are not so easily overcome. Some of these enthusiastic inventors have doubtless discovered that a working-model of an automatic car-coupling may work to a charm and last for years, as a model, while at the same time it would not survive the shock of a half dozen couplings in the actual running of trains. The same may be said with respect to nut-locks. Some of these devices may work tolerably well in ordinary machinery, but turn out to be quite worthless upon cars and track. Many automatic switch and signal contrivances also fall far short of the mark when it comes to the final test of practical performance. These lame and impotent devices will be weeded out to a great extent from the general category, and so far as this is done it will be a benefit to inventors, venders and users. There were, of course, many inventions that were not sufficiently matured to warrant their being placed on exhibition, and many of these, it is safe to say, will be greatly modified or entirely abandoned where they are seen to be impracticable or anticipated by others.

In regard to the management of the exposition, it is but just to say that it did not deserve the harsh criticisms of the Chicago press. There were, to be sure, some shortcomings, and reasonable grounds of complaint in the matter of awards. But, as every body knows, first premiums are not an infallible evidence of superiority. The bronze and gold in some cases got a little mixed, like the nautical Irishman's ox team, the starboard ox getting on the larboard side and *vice versa*, and both considerably tangled up in the rigging. The juries had a difficult and thankless task and could hardly be expected to please every body and themselves too.

While the show as a whole was a delight to the eye, there was at least one exception when we come down to details, and that is barbed fence-wire. It is, to be sure, a railway appliance because it is used for fencing in the tracks. But the sight of it is suggestive of cruelty—as much so as are the primitive weapons of the South Sea Islanders exhibited in museums in the form of long pieces of wood with a row of wicked looking sharks' teeth on each side to cut and lacerate their foes. It is a barbarous business, and after all the fence is not a reliable one. It is only a cheap substitute for timber rails, hedge or stone. If wire fences must be used, let them be made of plain wire and plenty of it so as not to tear and mangle live stock.

Another objectionable feature, to my mind, was the display of nude statuary in the press rooms. Perhaps this may be a mere prejudice which a greater familiarity with the renowned art galleries of the old world would overcome, but it seems to me that the same number of tobacco signs in picturesque Indian costume would have answered every purpose, esthetically speaking. A museum of anatomy is well enough in its place, but there is no very obvious analogy between it and railway appliances.

CHICAGO, July, 1883. WM. S. HUNTINGTON.

Mexican Railroads.

The *Mexican Financier* gives the following list from official sources of the railroads completed in Mexico up to the end of April:

		Miles.
Tiascala Railroad		2.50
Orizabia-Ingenio		3.00
Nuetla-Tiasciaco		3.75
San Andres		7.00
Tialmanaico		9.00
Pueblo & Matamoras Izucar		19.00
San Martin		23.00
Tehuacan-Esperanza		31.00
Tehuantepec		31.00
Sinaloa & Durango		36.00
Vera Cruz-Medellin		39.00
Hidalgo Railroad		56.00
Pueblo San Marcos		57.00
Yucatan lines		68.00
Mexico Tlalpulalpam		75.00
Sonora Railway, Guaymas to Nogales		234.00
Interoceanic, Mexico to Cuantla and branches		183.00
Mexican National, Mexico to Acambaro	178.00	
Laredo southward	208.00	
Branches	87.00	
		473.00
Mexican Central, Mexico to Lagos	311.00	
Paso del Norte to Chihuahua	302.00	
Tampico to San Luis Potosi	62.50	
		675.50
Mexican Railway, Vera Cruz to Mexico	264.00	
Puebla & Jalapa branches	89.50	
		353.50
Total		2,379.25

The table foots up 2,379¼ miles, although the *Financier* gives the total completed road at 2,437 miles. The Mexican National, the Interoceanic, the Hidalgo and the Yucatan lines are narrow gauge, the rest standard gauge. A number of the shorter lines given above are worked by horse-power, and some of them have been in existence a long time.

A GERMAN has invented a safe that, on its lock being tampered with, throws open its doors, seizes and drags and locks in the burglar, and handcuffs and holds him in readiness to be conducted to the police court in the morning. A Yankee is experimenting with a set of books for the use of county officers, which, as soon as a fraudulent entry is made in them, will, by means of a clever electrical contrivance, sound an alarm on the court-house bell.

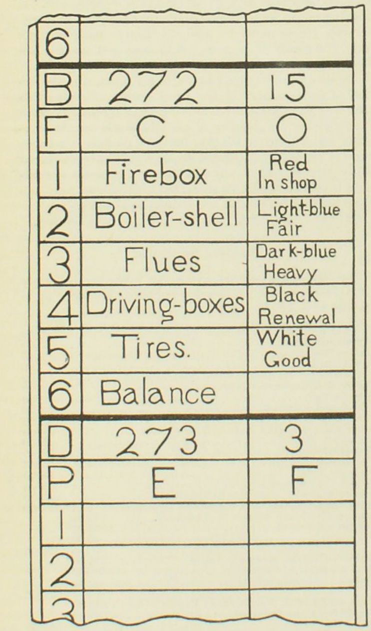
Continuous Brakes in England.

British railway practice continues to be quite chaotic on the matter of continuous brakes for passenger trains. Considering that the whole island is smaller than several of our States, and that one strong government rules the whole country, it might be supposed that systematic uniformity would be observed in a matter so essential to safe travel as a continuous brake. Such is not the case, however. For the last ten years the government has been using its very strongest moral suasion, mixed with threats of impending arbitrary laws, to induce connecting railways to agree upon some efficient automatic brake. But they have not agreed at all, and each railway uses the brake that its officers are most deeply interested in. This has a curiously confusing effect upon some portions of through travel. A locomotive hitches on to a train that is going through some three or four hundred miles, and half the coaches have brakes that the engine cannot connect to, and when the end of the division is reached another engine couples to the train that has a brake which suits none of the coaches. The chances of the brake on the locomotive agreeing with that attached to the majority of the coaches seems very slim. A recent run under conditions of this kind, which ended in a smash through want of brakes to control the train, brought out a vigorous protest from the government inspector, but the companies seem to care as little for his wrath as they do for the safety of travelers.—*American Machinist.*

A Systematic Record for Locomotives in Service.

A very effective method is employed at the Aurora (Ill.) shops of the Chicago, Burlington & Quincy road, by means of which the condition, whereabouts, and other particulars in regard to locomotives in service on the line are shown at a glance. The plan is understood to have been devised by Messrs. G. W. Rhodes, Wm. Forsyth and L. E. Johnson, of the mechanical department of the road, and will readily be appreciated by every master mechanic who is in need of such a system, or a similar one, to give him the desired information at all times with certainty, and without the trouble of correspondence. The method referred to may be understood by the following explanation and accompanying diagram:

A frame about six feet square is fitted to receive a number of perpendicular slats or strips about 3½ inches wide. A portion of one of these slats, with the figures and lettering on its face, is represented in the diagram. Each slat is held in place by a catch, and can be removed when desired. On the face of each are dove tailed depressions, strips of sheet brass or other means by which a piece of card-board can be inserted across the slat. The letter B and the figures 272, near the top of the diagram, indicate the class and number of the engine as written on the strip of card; the figures 15 at the right indicating the number of months the engine has been out of the shop. This latter number is, of course, changed every month the engine remains out, so as to keep the record correct. On the next space below is the letter F, which indicates that the engine is a freight engine, and the letters and O are the initials of the terminal stations of the division of the road on which the engine happens to be. Below the letter F are permanently fixed the numerals 1 to 6, representing the respective parts of the engine, as written opposite; and opposite these are blank strips of different colors, indicating condition of parts, etc. In practice, however, this feature of the system can be varied according to circumstances, the names and designations in the diagram being used only by way of illustration. In case an engine has just left the shop after a thorough overhauling, the spaces on the right would all be filled with white slips, indicating that all the parts were in good order. Should the fire-box get to leaking badly after running a while, a dark blue card would be substituted for white opposite 1, to show the fire-box's condition. If the driving-boxes should get a little out of shape, a light blue slip would be inserted opposite 4, and so on. When an engine goes into shop for heavy repairs on fire-box and flues, a red slip would be placed in the spaces occupied respectively by "Fire-box" and "Flues," showing that the engine was in shop for repairs on these parts, while the extent of the repairs would be indicated by the color of the card placed to the right of them, which in such cases would be dark blue. If other parts, such as tires, driving-boxes, etc., need attention, a red card in the proper spaces, with the designated color opposite, will show the fact. Next below the word "Balance," passenger engine No. 273, Class D, running between stations E and F, follows, and so on with all the engines of the road.



The master mechanic of each division of the C., B. & Q. road renders a monthly report to the superintendent of the locomotive and car departments, stating the condition of each engine on his division. The blank form of the report embraces the following details of parts, with blank spaces to be filled up:

Fire Box.
Stay Bolts.
Crown Bars.
Boiler Shell.
Smoke Arch.
Flues.
Driving Boxes.
" Wheels.
" Axles.
Carrying Gear.

Tires.
Frames.
Cylinders.
Pistons.
Cross Heads.
Guides.
Valves.
Valve Gear.
Pumps.
Boiler Jacket.

Engine Truck.
Pilot.
Steam Pipes.
Cyl. Saddle.
Guide Yokes.
Ash Pan.
Foot Boards.
RunningBoards.
Cab.
Trimmings.

Engine.
Air Brake.
Bell Ringer.
Smoke Stack.
Tank Body.
" Frames.
" Trucks.
Paint—Engine.
" Tank.

The blank spaces are to be filled invariably with the word "Good," "Fair," "Repairs" or "Worn Out," referring respectively to "present condition," "needing light repairs," "needing thorough overhauling," "needing renewal." In addition to the monthly report, a blank is to be filled out and forwarded whenever an engine is taken into or turned out of the shop, giving date of taking in, and character of repairs done when turned out.

Wheels, Rails and Brakes.

The following extracts are taken from the address of Mr. Reuben Wells at the recent meeting of the Railway Master Mechanics' Association:

"As regards the wear of wheels and rails, it is a question whether a wider top to the rail would not add proportionately to the durability of these parts. Within a few years we have largely increased the weight on the wheels, in some cases nearly doubled it, but have not widened the rail—the only thing that can be done to increase the point of contact—and as a consequence we find the wear of both has been increased proportionally. If the part of the tread that now projects beyond the rail could also have a bearing on the rail and carry its proportion of the load, the durability of the wheel, as regards the natural wear of its face or tread, would be increased as much perhaps as 20 per cent., with a proportionate increase in the durability of the rail.

"The best shape for the flange and tread of the wheel and for the inner edge of the rail are questions about which there is much diversity of opinion among those best informed on the subject. Scarcely any two wheel manufacturers make the shape of the flange and face of the wheel precisely alike, and there is equal variation in the curve-lines of the edge of the rails against which the flanges have their bearing.

"As regards diameter of the different sizes of chilled wheels in general use, there should be standards fixed for the diameter of the chills in which they are cast, so as to insure as far as possible a uniform diameter in wheels of a given size. Uniformity in pattern is very desirable and tends to promote economy. It may be possible, however, in the case of locomotives, to attach more importance to the subject of uniformity than the results will warrant.

"It would not be considered profitable to use a four-horse team to haul one-horse loads, nor good policy to use four one-horse teams to haul four-horse loads. True economy, it seems to me, requires that the machinery be perfectly adapted to its work in size and pattern. The greater the number of cars hauled per train, the less will be the cost per car for train expenses; but if there are but few to haul at a time, the engine large enough to haul them at the required speed will be cheaper than one that is larger than necessary; but if the engine must be used for both heavy and light trains, it cannot then be a question as regards the lighter trains.

"A brake, well adapted to freight engines and a good reliable brake for freight cars, automatic in action in case of the train breaking in two parts, and under the control of the engineer to apply at will and graduate as desired, is something greatly needed. A brake of this kind would enable faster time to be made; it would be the means of greater safety from accidents and would result in greater economy in the wear of wheels, particularly on roads having numerous and heavy grades, where much damage results from wheels sliding by the use of the hand-brake. The difficulties, however, to be overcome in designing a brake perfect in action, and keeping it in good reliable working order, are seemingly insurmountable. To derive substantial benefits from a freight train brake, its adoption must be general, otherwise the mixing of foreign cars in trains, as now, would interfere greatly, if not entirely, with its usefulness. If such a brake can be perfected, and all roads adopt it and keep it in good order on foreign cars in their possession as well as their own, it will result in great economy. Whether such a brake can be perfected, applicable to our present style of car, may be a question, but it is certainly to be desired."

THE exhibit of the Machine Tool Works, of Philadelphia, at the Chicago Exposition, embraced ten of the most important machines necessary for a complete railway outfit, and of this number, seven were awarded the highest prizes.

THE Penfield Block Co., of Lockport, N. Y., received at the Chicago Exposition the bronze medal for best Baggage Barrows, also the first bronze medal award for Anchor Brand Pulley Blocks.

NATIONAL CAR BUILDER
PUBLISHED MONTHLY
BY
R. M. VAN ARSDALE.
MORSE BUILDING........................NEW YORK.

JAMES GILLET, Editor.
FRANK C. SMITH, M. E., ASSOCIATE EDITOR.

AUGUST, 1883.

CONTENTS.

ILLUSTRATIONS:

Page.
Replacing Engine on Track........ 86
Foster's Locomotive Valve Gear........ 88
Cylinder and Piston of Standard Engine L. & N. R. R........ 88, 89
Standard Conductor's Car, N. Y. Central & H. River R. R. ... 90, 91
Record of Locomotives in Service........ 94

COMMUNICATIONS:

English and American Locomotives........ 92
Capacity, Construction and Speed of Freight Cars........ 92
Reply to "The Engineer"........ 93
Train Resistance........ 93
The Chicago Exposition, A Few After-thoughts........ 93

EDITORIALS:

Standard Box Car........ 94
Flange Wear of Wheels........ 95
Street Railway Motors........ 95
Accident at Plainville, Conn........ 95
Railway Grade Crossings........ 95
Baggage and Baggage Smashers........ 96

MISCELLANEOUS:

Refrigerator Cars, Report of Committee on........ 86
Awards of Juries at the Chicago Exposition........ 87
Train Brakes, Tests of........ 88
New York, West Shore & Buffalo Railway........ 88
New Finishing and Veneering Woods........ 88
Compounding Colors in Passenger Car Painting........ 88
Rules Governing Interchange of Freight Cars........ 89
Extended Smoke-Box in Locomotives........ 92
Mexican Railroads........ 93
Systematic Record for Locomotives in Service........ 94
Wheels, Rails and Brakes........ 94
New Driving Cars........ 93
New Method of Laying Rail........ 93

EDITORIAL ANNOUNCEMENTS.

Addresses.—*Business letters should be addressed, and draft and money orders made payable, to* THE NATIONAL CAR-BUILDER. *Communications for the attention of the Editor should be addressed* EDITOR NATIONAL CAR-BUILDER.

Advertisements.—*Nothing will be inserted in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *The editorial department will contain our own views and opinions; and the rest of the reading matter, aside from advertisements, will be such as we consinder of interest to our readers.*

Contributions.—*Articles relating to railway rolling stock construction and management, and kindred topics, by those who are practically acquainted with these subjects, are especially desired. Also early notice of changes in railroad officers, organizations and names of companies.*

Special Notice.—*As the* CAR-BUILDER *is printed and ready for mailing on the last day of the month, advertisements, correspondencee,etc., intended for insertion, must be received no later than the 25th day of the month.*

SUBSCRIPTIONS *to the* CAR-BUILDER *will be received, and opies kept for sale, at the following places:*
A. WILLIAMS & CO., 283 *Washington St., Boston, Mass.*
L. SCHAFFNER, *Cigar and News Dealer, Grand Pacific Hotel, Chicago, Ill.*
WILLIE H. GRAY, 306 *Olive Street, St. Louis, Mo.*
ROBERT CLARKE & CO., 65 *West Fourth Street, Cincinnati, Ohio.*

A STANDARD BOX CAR.

At the recent meeting of the Car-Builders' Association, at Chicago, a resolution was adopted providing for the appointment of a committee to confer together and agree, if possible, upon the details of construction of a standard freight box car, with a maximum carrying capacity of 30 tons; the committee to consist of seven members representing the largest car-owning roads that send members to the Car-Builders' Convention.

This looks as if the members of the Association were alive to the importance of a subject that has been agitated at its annual meetings for many years without arriving at any definite result. Upon looking over the reports of the proceedings of previous meetings, we find that eight years ago several hundred circulars were sent out by a committee on the "size and framing of freight and passenger cars," the circulars containing, among other questions, the following:

"Would the officers of your road entertain the idea of a national car duplicate in all its parts, except wheels and springs? The plan of such a car to be chosen from a sample car selected from one designed and built by each railroad company, such selection to be made by the officers of the railroad companies?"

To this question there were 18 replies, half of which were favorable to the proposition and half adverse, the favorable responses being from car-builders connected with through-line roads, and the unfavorable ones from those connected with roads whose business was mainly local. The committee in its report recommended a 29-foot car for ordinary traffic, and a 34-foot car for more bulky freight, both sizes to have a carrying capacity of 15 tons. This was in 1875. With respect to the views of members representing through and local lines in the association now, there is probably not much change as to the need of a "national" or standard car, but as regards the carrying capacity of such a car and the correspondirg requirements in the details of construction, the change has been very great, so much so, indeed, that had a car been selected at that time in the way proposed, it would have been found to-day very inadequate for the service required. Manifestly the time had not then arrived for settling the dimensions and details of a "national" box car, but it seems to have arrived now if there is ever to be such an epoch in railway car construction.

The basis upon which the committee of seven must now work is a capacity of 30 tons, or twice as much as was thought sufficient eight years ago, and it is perhaps an open question, even now, whether the demand for increased loads is likely to stop at this high figure. This is an important preliminary matter that should be well weighed before proceeding to work up the details. Any standard to be satisfactory all round must meet existing requirements, or else new cars will not be built to conform to it by any class of roads, although it is very true that a standard not quite up to the mark, if adopted and rigidly adhered to, is better than none at all. A car of this sort with details of all parts includes a truck, and a truck includes axles and wheels. The report of the committee at the Chicago Convention on standard trucks is short, comprehensive and to the point. While it states in a general way the chief requisites, it is positive that no standard can be determined upon until the load it is to carry is definitely known.

In grappling with this problem the association has shown that it is not afraid of serious work, a kind of work that can not well be evaded, nor is there any half-way house between success and failure in its performance. Some may be sanguine enough to expect that a car, complete in all its details, will be designed in a year, and be in readiness for adoption by the roads. We hope it will be so, but will feel quite content if the consummation is reached in two, three, or even in five years, and in such case will regard it as a successful test of the efficiency of the reorganized association, as compared with its former status. We question very much the expediency of the adoption of a standard by a preponderance of votes cast by the representatives of the so-called trunk lines, and in this way compelling the other lines to follow their example. What is wanted is not merely a two-thirds vote on the car basis, but a degree of unanimity that will insure the universal acceptance of what may be technically adopted.

It has been intimated in the columns of a prominent railroad journal that the committee of seven may possibly prove deficient in ability, skill, knowledge and experience, or that they may not fully appreciate the nature of the problem. If this intimation shall be justified by the performance, why, then, that is the end of it. There will be no standard box car for many years yet, and the roads will have to get along with their local standards as they do now, approximating as near to uniformity as individual theories, notions and preferences will permit. The active and representative members of the association (the latter more particularly) are presumed to have a practical knowledge of car construction. If from among the members representing the largest car-owning roads, seven can not be selected with mechanical ability of a sufficiently high order to devise a standard box-car, truck and all, what is to be done? Can a like number be found outside of the association, and if so, where? Must the association be re-organized again in order to evolve the requisite ability? It seems to us that if any body or class of men in any way connected with railway service is capable of performing the duties undertaken by this committee, it must be those who have had large experience in the superintendence of the car departments of our leading roads.

FLANGE-WEAR OF WHEELS.

One of the perplexing problems in railway operation is the flange-wear of wheels. Not that there is anything very strange or unaccountable in the fact that flanges should wear more or less rapidly in the severe service to which they are subjected, but that the wear should be so capricious and variable. The purpose of the flange is to keep the wheel in position on the rail under circumstances that are at times exceedingly trying, and the fact that it wears thin in doing so is an evidence that it performs its duty. It can not help wearing out any more than the wheel tread can, or an axle journal or a grindstone. If all railway tracks were straight and level there would be flange-wear more or less; if not, flanges might in such case be dispensed with altogether. But upon lines of road with numerous curves, the momentum of ordinary trains moving at average speed is a severe test both of flanges and rails, and the wonder is that the wear is not much greater than it is. If all wheels were of a uniform shape and quality, and all rails of a uniform section and hardness, there would seem to be no reason why the flanges of all wheels running on the same line of road should not wear equally. But unfortunately there is no such uniformity in wheels or rails, nor do the same wheels run continuously over the same rails, hence there is a most surprising diversity in flange-wear, so far as can be ascertained from report and common observation and belief, in the absence of any reliable statistics on the subject. The estimates of the number of wheels removed on various roads on account of sharp flanges, range all the way from three to forty per cent. of the whole number removed.

If these estimates are approximately correct, they open up a field of investigation of a very inviting kind. The aim should be, not so much to ascertain the general cause of flange-wear, which is as plain as day—and about which there can hardly be any difference of opinion—but to ascertain the specific causes which produce such diverse and irreconcilable results. The subject comes up every year in its regular order at the meetings of the Car-Builders' Association; there is the usual discussion lasting fifteen or twenty minutes, and then the matter goes over another year, when there is a repetition of the surmises, impressions and theories that were broached the year before. These may be epitomized as follows: Trucks out of square; wheels of different diameters on same axle or pressed on at different distances from journals; one wheel harder than another; load unequally distributed in body of car; too much weight on side-bearings; improper action of brakes, etc. The opinion, however, has been gaining ground recently that the chief cause of flange-wear is the fact that the curve at the base of the flange does not correspond with the curve of the inside top corner of the rail, the radius of which in each case should be ⅝ inch. There may be something in this. It is obvious that if wheel and rail are made to match at the start they will not have to be matched by wearing, and that much abrasion will be saved thereby. But it remains to be seen whether this will cause a uniform wear of the flanges. If not, then there are other important conditions that remain to be cleared up.

It seems that the trouble is not peculiar to cast iron wheels nor to an excess of track curvature. In England, where steel-tired wrought iron wheels are universally used, and where curves are lighter and less frequent than on our roads, the same difficulty is experienced, as well as the same puzzling phenomena that defy any satisfactory deductions as to specific causes and remedies.

STREET RAILWAY MOTORS.

Is there any sufficient reason why horse-flesh should be so universally relied upon to transport millions of people over the long, straight and comparatively level thoroughfares of our cities when steam could do it just as well and as many think more cheaply, humanely and with more perfect subjection to control? The contrast exhibited every day between the two motors would be ludicrous if people were not so accustomed to it. Cars can not of course be run upon surface roads in cities with the speed of the wind. Their movement must necessarily be slow in order to meet the requirements of traffic, but is there no sort of motor available for the purpose except horses? Past experience answers no, and it really looks as if future experience would continue to give the same answer unless the so-called cable system shall grow more rapidly in favor than it has done since its first introduction in San Francisco ten years ago. Aside from the cable system, we have had during this period numerous experiments with steam and compressed air, all of which, or nearly all, were represented as being eminently successful in respect to safety, economy, comfort and every essential requisite. And yet, after a few trial trips, more or less, and sundry flattering notices in the newspapers, they disappeared from sight and the wretched and overworked horses had it all to themselves again.

The files of the CAR-BUILDER contain descriptions and illustrations of a number of these street car motors There was the Remington car, which was tried in 1873. It had a Baxter upright boiler on the front platform, and carried sixty passengers on the Bleecker street line in New York, rounding the curves and getting over the grades beautifully, having a noiseless exhaust and consuming only five pounds of coal per mile. In 1876, the Baldwin Locomotive Works built a steam car for the Atlantic avenue road, in Brooklyn, which was pronounced to be a great success by members of the city council, mechanical experts and others, the trips being made in half the usual time with one or two other cars attached to the steam car. Then there was the Angamar steam car, which made regular trips on the New York Third Avenue line for a period of two months in the summer of 1879. On the front platform was a small furnace and boiler. The requisite quantity of hot water was supplied from a stationary boiler at the starting station, and by throwing a few shovels full of live coals into the furnace, steam was generated sufficient for the trip without carrying any extra fuel. The working parts of the engine were underneath the car and hidden from view by side aprons. This car was under better control than horses, could do, as was claimed, a quarter more work of itself, besides hauling two others cars if necessary, and withal could be run cheaper than horse cars. The Ransom steam street car, built by Gilbert, Bush & Co., in 1877, was also a very complete affair, and performed excellent service, according to report, on the Market Street Railway of Philadelphia. Then there were a number of compressed air motors, similar in their design to the Mekarski system which is now attracting some attention in Europe. In France, the Paris Tramway Company has within the last five years experimented with twenty different systems for applying steam as a motor upon street railways, but without success. So the problem remains practically unsolved, unless the utility of the cable system shall be developed to such an extent as to warrant its introduction in our large seaboard cities. The possibilities of electricity are yet to be ascertained. In the present stage of investigation no one will attempt to fix a limit to the mechanical uses to which it may be applied Inventors in these times are not deterred by obstacles, and will not be, so long as street surface roads are dependent upon the costly and cumbrous animal motors so characteristic of a by-gone age.

THE ACCIDENT AT PLAINVILLE, CONN.

A signal illustration of the swift and terrible fatality which is liable to result from the negligence and stupidity of a railway employé occurred on the New York & New England road, near Plainville, Conn., on the 9th of July. A passenger train of four coaches, with every seat in them occupied, collided with a gravel train on a curve where each side of the road was densely wooded, rendering it impossible to see an approaching train until the curve was rounded. Both trains were moving at more than ordinary speed, the gravel train being an extra with orders to get to Plainville station without delay, so as to leave the line clear for the passenger train; and the engineer of the passenger train being behind time, was anxious to make it up. The crash of the collision was immediately followed by the explosion of the passenger locomotive, making the havoc doubly fearful. Three persons were instantly killed and a number of others seriously injured. Several cars were badly wrecked, and the engines were, of course, a mass of fragments. All this was caused by the neglect of a telegraph operator to give attention to a dispatch sent to him instructing the station agent to hold the passenger train on a switch until the arrival of the gravel train.

If this mere outline statement, made up as it is from the accounts in the daily papers, corresponds with the facts, it may be asked where the blame should rest. Viewed superficially, the universal response will be that the unfaithful telegraph operator should bear the whole of it. That he was the direct cause of the disaster seems very clear. But a thorough and impartial investigation of what may be called the indirect causes might possibly modify this superficial verdict, and give the blame a wider distribution. It may be asked, upon what principle of selection, and according to what system of discipline, is such a person placed in a position where his heedlessness and apparent lack of a proper sense of responsibility may lead to such deplorable results? Precautions against accidents may be ever so well planned, but to be effective there must be an unceasing personal vigilance on the part of every employé whose action or inaction has any thing to do with the movements of trains. A momentary forgetfulness, a preoccupation or confusion of mind, a transient indifference on the part of a single individual to the requirements of duty, is as dangerous in railway practice as in conducting the most hazardous military movements in the face of an enemy. It is safe to say that there was something in the mental and moral make-up of the telegraph operator at Plainville that disqualified him for the duties of his position, and this disqualification should have been sufficiently apparent to some one to have prevented his being intrusted with duties he was incompetent to perform.

It is gratifying to be informed that the officers of the New York & New England road attach no blame to the unfortunate engineer of the passenger train, who knew nothing of the neglected dispatch or of the approaching gravel train, but heroically remained in his cab when he might have jumped from it and saved himself from being pinioned in the wreck of the engines, and hurled a moment afterward into the air by the force of the explosion.

RAILWAY GRADE CROSSINGS.

The absence of fencing for railway tracks in this country, the unguarded crossings, and the exposed condition of tracks in large towns, very naturally surprise foreigners who come here. The indifference of our own people to these things is accounted for on the theory that they have got used to it because it has always been so. With limited capital and long lines to construct, we have been eager to realize the advantages of railways as quickly and as cheaply as possible, without providing the necessary safeguards for the protection of human life. With the rapid growth of towns, cities and suburbs, and the increase of stations and settlements along the lines, the number of crossings and trains becomes greater every year, with a corresponding increase of danger. Compactly built cities are not unfrequently intersected for considerable distances by steam roads with a heavy traffic, and with nothing in the shape of a fence to keep off heedless and reckless intruders. Newark, N. J., was, for many years, a noted instance of this kind; the open track of a great trunk line running for nearly two miles through a populous portion of the city. Of late, however, the track has been fenced, and the street crossings provided with safety-gates, the result being a greatly diminished number of casualties as compared with the previous record. At Elizabeth, a few miles further on, the Central of New Jersey and Pennsylvania R. R. tracks cross each other just at the point where they are intersected by the principal street of the town, and where some four hundred trains pass every twenty-four hours. Here, also, is the union passenger station of both roads, and immunity from accident is largely due to the vigilance of a veteran flagman, who is rarely absent from his post, the erection of fences and gates being impracticable from the nature of the surroundings.

This is by no means an exceptional case. Similar ones are to be found all over the country, to say nothing of the immense number of unprotected grade crossings outside of town and city limits to be found on all lines of railway. It will not do to throw the responsibility upon the victims who happen to get killed or maimed because they fail to heed bell, whistle or signal. No person in town or country should be left to depend upon his own judgment as to whether there is time for him to walk or drive across a track when a train is approaching. They should be protected, not only by gates and fences, but by being made subject to legal penalties as well for unauthorized intrusion upon tracks. The responsibility for the neglect which has hitherto prevailed in regard to this subject rests primarily with the law-making power. The stringent regulations which exist in some European countries could not probably be introduced here without being considered oppressive, but as a protection, both to railways and the public, such regulations are none the less humane, salutary and needful.

BAGGAGE AND BAGGAGE-SMASHERS.

The summer hegira of pleasure seekers from the great centers of population is a severe ordeal for the baggage-smasher. His vocation is not the playful pastime it once was, when fun and severe muscular exertion were combined in about equal proportions, and when the handling of every piece of baggage made business for the trunk makers. The traditional "Saratoga" has of late grown wonderfully in dimensions and in power to resist shocks. The modern structure is longer, wider, deeper, more substantial and a great deal heavier than its more flimsy prototype of a dozen years ago. The frame, or shell rather, is of lap-welded iron jacketed with hemlock tanned sole-leather made of the hides of Texas steers. The inside is divided into compartments by strongly riveted metallic partitions, and the entire trunk is trussed so as to resist the most severe compressive strains. It can not be wrecked except by a first-class telescoping collision. The baggage-smasher can do nothing with it but slide it on skids or raise it with block and tackle. It can't be tossed up nor pitched around in any off-hand, sportive way. The loading, unloading, piling up, stowing away and transportation of the season's quota of these things has become a serious business. The handlers stand aghast and seem half inclined to go on strike. The railway companies are also becoming uneasy. One of them has issued an official notice to "whom it may concern," that no single piece of baggage weighing more than two barrels of pork, or occupying more than 150 cubic feet of space, will be received for transportation in baggage cars at any thing less than fourth-class freight rates. Nobody will pretend that there is any grinding monopoly or corporate cheek in this. In the city of Philadelphia alone, it is estimated that thus far during the present season, some 300,000 pieces of baggage of the so-called "Saratoga" pattern have been handled at railway stations and at the piers of European steamers. These trunks, it is very likely, will all come back in the fall heavier than when they went, the weight of wearing apparel being supplemented by that of an immense quantity of bric-a-brac nicknackery packed like concrete into every corner and crevice. This will try the sinews of the smasher again, and well it will be for him if he comes out of the ordeal with his constitution unshattered and health unbroken. Instead of abusing him for his innate destructiveness, as has been the fashion in times past, he deserves to be greeted with plaudits and presented with a valuable silver tea-set, as were the heroes of old who returned victorious from the Olympic games.

As a matter of record, as well as of interest to our advertising patrons and readers generally, we print the list of awards to exhibitors at the Chicago Exposition. It should have appeared in our last issue, but owing to the inefficiency of the management its completion was delayed, so it did not reach us in time. As an index of the comparative merits of the numerous exhibits we do not consider it as decisive by any means, although many and perhaps all of the medals granted were well deserved. The system in reference to prizes was not carried out in accordance with the rules announced at the start, and many meritorious exhibits were consequently withdrawn from competition that would otherwise have been included in the list of awards. This should be borne in mind lest it might be supposed that all exhibits not included in the list are necessarily inferior and unworthy of favorable recognition. Whatever may have been the apparent injustice done to such parties, however, it is gratifying to note that the flattering and significant award of a gold medal was not withheld from the enterprising publisher of a Chicago railway journal, who exhibited a private car of such peculiar design and construction that the idea has been broached of running it dead-head over the railway lines of the country in order to give people an opportunity to see it who might have overlooked it at the exposition, or have inspected it too hastily to thoroughly appreciate its merits.

WE are requested to call the attention of capitalists who are desirous of making a good investment, to the offered sale of the Bellefonte Car Works, at Bellefonte, Pa. The property is in excellent condition, and will be sold at a bargain and upon favorable terms. For particulars, see advertisement.

New Dining Cars.

The Michigan Central Railroad Co. has recently placed two new dining cars, "Wentworth" and "Australia," on its line, to be run on the principal express trains between Chicago and Buffalo. In their design, finish and general attractiveness for dining purposes, they are said to be in advance of any other cars of their class now in service. Mr. Robert Miller, the Master Car-Builder of the road, furnishes the following description of them to the *Railway Purchasing Agent:*

"Outside measurement of car body, 10 ft. 2 in. by 64 ft. 2 in.—including platforms, a trifle less than 70 ft. long. Platforms and draw attachments, such as are known as the Miller patent; sides of car covered with narrow ceiling put on with perpendicular joints, matched together in the usual manner, except as to the use of the old-fashioned bead; to relieve the joint, what is known as a V joint is used. Windows all made with double sash to exclude as far as possible all dust and to secure greater warmth in cold weather. The floors are of white ash and unpainted. Dining-room, in the clear, measures 9 ft. 2 in. by 30 ft. 9 in., giving ample room for ten tables with four seats at each table. A room adjacent to this, separated by an open partition from the dining room, contains a sideboard standing in center of car and back from the opening in partition sufficiently to allow a passage on either side to and from the serving-room. Floor of this room is 9 ft. 2 in. by 9 ft. 11 in. It contains, besides the sideboard. a very complete arrangement of cupboards for glass and ware of such description as such service requires. The kitchen is 7 ft. by 16 ft. 6 in., containing a very complete range, manufactured by Wilks, of Chicago, together with ice chests, cupboards, water tank for both hot and cold water. A lavatory at opposite end of car, 5 ft. 7 in. by 9 ft. 11 in., also contains a Baker heater for warming car, also linen closet, wine chests, etc. The inside of car is finished in solid oak, relieved by ash burl panels. The panels between the windows and directly opposite each table contain a French plate mirror. The otherwise plain solid oak is relieved by a sufficient amount of carving to produce a very pleasing effect. The seats are hinged to turn up like an opera chair, so persons can get seated at the table with greater ease. The trucks are the combination of the best known modern ideas, being what are termed six-wheeled, or twelve 42-in. Allen paper wheels under each car, bolster spring, elliptic equalizer springs, round bar spiral, 8 in. in diameter, and 10 in. high, made by A. French & Co., of Pittsburg. They are equipped with the Westinghouse automatic air brake, Miller coupler, buffer and platform, and every appliance for safety and comfort known."

We understand that two more cars called the "Detroit" and "St. Thomas" are to be added to those above named, making four in all.

New Method of Laying Rail.

John M. Reid, of Allegheny City, has patented a design for laying steel or iron railroad rails that he claims will forever bar accidents caused by ditching of trains through the expansion or contraction of rails by heat or cold. The object of the invention is to produce a better railway, more reliable and safer than heretofore, and without lateral or vertical motion. Instead of wasting so much timber in the ties, Mr. Reid proposes to have only 900 ties per mile of single track, and these need not be more than 7 feet long by 5 inches square. He then lays timber cushions or beams under both rails lengthwise, 12 inches deep by 6 inches thick, the beams having a lengthwise groove to receive the diaphragm of the rails, completing both ties and cushions with not more than 6,300 feet of preserved wood. The crown or upper part of the rail, which is subjected to friction, is made much heavier than usual, the base is made broader, with a diaphragm below to resist lateral pressure. A safety-stay coupling made of cast steel is fitted and inserted in the abutting ends of the rails. These are held down by heavy screws in the wood cushion beneath. In addition to the safety guarantee in this invention, it is claimed that it is cheaper and can be kept in repair for much less cost than any other method in operation. It will be noticed that Mr. Reid's device is much the same as that of Thomas Johnson, Vice-President of the Indianapolis Street Railway. The track laid about one year ago, on North Illinois Street, is similar to that which Mr. Reid has secured his patent on.—*Engineering News.*

Ajax Metal—To Whom it May Concern.

Having been informed that certain parties have made the assertion that we are manufacturing under their patents, we have deemed it advisable to deny this statement, and to publish the following affidavit of our Mr. Clamer, Inventor of the "Ajax" Metal, and who has been making the same for over ten years.

THE AJAX METAL CO.

Affidavit.

Philadelphia City, ss.:

Francis J. Clamer, being duly sworn, deposes and says: One E. C. Kirk, as I am told, falsely announces that the "Ajax Metal," which I manufacture is an infringement on his patent. I deny that said Metal does thus infringe, directly, or indirectly, or that I use his process in manufacturing. The process used by me is one invented long before his application was filed, and does not use what he claims in his patent. In my opinion it is much superior to his, and I would deteriorate my Metal if I used the substance patented by him.

F. J. CLAMER.

Sworn to and subscribed before me, a
Notary Public of the Commonwealth of Pennsylvania, this 27th
day of July, 1883.

GEORGE HOUSE, Notary Public.

Book Notices.

Twenty Years with the Indicator, Vol. 1: By THOMAS PRAY, JR., C. E., M. E.—This is a work which will be of great service to steam users, engine builders and working engineers. It contains the results of an extended practical experience and observation in the use of an instrument which has hitherto been, and is now, working its way to a wider appreciation in the economy of steam engineering. The author gives a history of the instrument from its early construction, noting the improvements that have been made as its value and advantages in determining the action of steam in the cylinders became better understood, until it has gradually come to be regarded as indispensable in all computations and calculations in the use of steam. The book contains a series of forty "Lessons," drawn from actual practice, and illustrated by diagrams taken from all types of engines and a great variety of valve motions, each lesson containing a detailed explanation of the cards as illustrating good or bad practice, or a wasteful or economical use of steam. Particular directions are given to guide the intelligent engineer in the use of the indicator in emergencies, so that with a little patient study he can become an expert in the adjustment of his engine under all the range of requirements, from slow moving low pressure engines, to high speed and high pressure locomotives. The diagrams are full size, so they can be measured and worked from accurately, or a tracing can be made for that purpose. The volume, if carefully examined and its contents applied in practice will go far to dispel the idea entertained by many that the steam indicator is a kind of curiosity or plaything to set forth theoretical results rather than those that are accomplished and actual. The forthcoming second volume will contain additional information with reference to the working of steam and the use and application of indicators. Published by the Boston Journal of Commerce Publishing Co., Boston, Mass.

Color Blindness.—The Chicago *Railway Review* has issued a pamphlet containing a reprint of the editorial and other matter pertaining to this subject that has appeared in that paper during the last two or three years. It is hardly necessary to say to those of our readers who are familiar with the attitude of the *Review* on color-blindness, that the tenor of this pamphlet is in favor of legislation making it compulsory on the part of railway companies to examine employés as to their capacity to discriminate colors. Although we think the danger from color-blindness in the running of railway trains has been very much exaggerated, it is nevertheless a matter that is deserving of careful investigation. This little pamphlet, in connection with the more elaborate treatise of Dr. B. Joy Jeffries, contains about all the information on the subject that is accessible at this time. We are informed that the pamphlet will be sent postpaid to applicants on receipt of 25 cents at the *Review* office as above.

Our Directory.

We note the following changes since our last issue:

Buffalo, New York & Philadelphia.—Oliver Watson has been appointed General Manager, with office at Buffalo, N. Y.

Chesapeake & Ohio.—E. T. Smith has resigned his position as Superintendent of the Eastern Division. T. L. Chapman is appointed Superintendent of Motive Power and Machinery, vice John McFarland, deceased.

Chicago, Saginaw & Canada.—This road has been sold under foreclosure, and will hereafter be operated by the Detroit, Lansing & Northern.

Cincinnati, New Orleans & Texas Pacific.—Richard Carroll, for some time past Superintendent of the Cincinnati Southern Division, has been promoted to the position of General Superintendent of all the lines controlled by this company.

Delaware, Maryland & Virginia.—This is the consolidated name of the Junction & Breakwater, Breakwater & Frankford, and Worcester roads.

Kansas City, St. Joseph & Council Bluffs.—Wm. Irving has been appointed General Purchasing Agent of this company, with headquarters at the general office of the Chicago, Burlington & Quincy Railroad, in Chicago.

Lake Erie & Western.—E. H. Waldron has resigned as General Manager. The duties of the office will be performed by the 1st Vice-President and General Superintendent.

Louisville, New Albany & Chicago.—John McLeod has resumed the office of General Superintendent of this road, which he resigned a short time ago. W. G. Sala is Superintendent of the Northern, and W. N. Marshall of the Southern Division.

Louisville & Nashville.—Captain Lee Howell is appointed Superintendent St. Louis Division, vice Mr. James Montgomery, resigned.

New Brunswick.—This company's lines now include the Aroostook River; New Brunswick & Canada; and St. John & Maine roads. E. R. Burpee is General Manager and F. W. Crane Superintendent.

New Haven & Northampton.—Stacy B. Opdyke, Jr., is appointed Superintendent, vice C. A. Goodnow, resigned.

New York & Long Branch.—H. H. Nieman has been appointed Superintendent vice J. F. Randolph, resigned.

Philadelphia, Wilmington & Baltimore.—Henry M. Carter is appointed Superintendent of the Maryland Division of this road. He has heretofore been Superintendent of the Middle Division of the Pennsylvania road.

Pittsburgh & Western.—E. K. Hyndman having resigned his position as General Manager, the office is abolished. Mr. W. C. Mobley is appointed Superintendent.

Texas & St. Louis.—A. S. Horner has been appointed Superintendent of this company's lines in Texas, with office in Texarkana, Ark.

Toledo, Cincinnati and St. Louis R. R.—W. H. Vandergrift is Superintendent of the Toledo Division, with office at Delphos, O.; M. B. Mann, Superintendent of St. Louis Division, with office at Cincinnati; and A. W. Salter, Superintendent of Southeastern Division, with office at Dayton, O.

Utica & Black River.—J. F. Maynard, for several years Vice-President and General Superintendent of this road, has been chosen Vice-President and General Manager.

A Good Business Opportunity.

THE BELLEFONTE CAR WORKS, at Bellefonte, Pa., are offered for sale at a great bargain, and partly "on time." They are well located and in splendid condition for immediate operation. For particulars, address JOHN C. MILLER, Bellefonte, Pa., who will show the property; or the owner, WM. LAWSON, P. O ox 2,116, New York, N. Y., who will sell it.

CLARENCE BROOKS & CO.,

MANUFACTURERS OF FINE

RAILWAY AND COACH VARNISHES,

Cor. West and West 12th Streets, New York.

JOHN W. MASURY & SON,

MAKERS OF STRICTLY FIRST-CLASS

Railway Varnishes,

AND MANUFACTURERS OF

CAR BODY COLORS.

By permission, we refer to the following Companies, for whom we have made Special Colors:

PENNSYLVANIA RAILROAD CO., Enoch Lewis, Purchasing Agent, Philadelphia, Pa.
PENNSYLVANIA CO., Wm. Mullins, General Purchasing Agent, Pittsburg, Pa.
BALTIMORE & OHIO RAILROAD CO., N. S. Hill, Purchasing Agent, Baltimore Md.
CHICAGO & ALTON RAILROAD CO., A. V. Hartwell, Purchasing Agent, Chicago, Ill.
CHICAGO & NORTHWESTERN RAILROAD CO., R. W. Hamer, Purchasing Agent, Chicago, Ill.
LEHIGH VALLEY RAILROAD CO., L. Chamberlin, Purchasing Agent, Philadelphia, Pa.
NORTHERN RAILROAD OF CANADA, F. W. Cumberland, Superintendent, Toronto, Ont.
NAUGATUCK RAILROAD CO., G. W. Beach, Superintendent, Waterbury, Conn.
PHILADELPHIA, WILMINGTON & BALTIMORE RAILROAD CO., S. A. Hodgman, Superintendent of Motive Power, Wilmington, Del.
NEW YORK, NEW HAVEN & HARTFORD RAILROAD CO., R. N. Dowd, Commissary, New Haven, Conn.
UNION PACIFIC RAILROAD CO., } A. D. Clark, Purchasing Agent, Omaha, Neb.
KANSAS " " " }
CHICAGO, BURLINGTON & QUINCY RAILROAD CO., Wm. Irving, Purchasing Agent Chicago, Ill.
LOUISVILLE, CINCINNATI & LEXINGTON RAILROAD CO., Wm. Mahl, Purchasing Agent, Louisville, Ky
GRAND TRUNK RAILWAY N. Wall, Port Huron, Mich.
LITTLE ROCK & FORT SMITH RAILROAD CO., T. Hartman, Purchasing Agent, Little Rock, Ark.
GILBERT & BUSH CO., Troy, N. Y. }
WASON MANUFACTURING CO., Brightwood, Mass. }
BILLMEYER & SMALL MANUFACTURING CO., York, Pa. } Railroad Car Builders.
JACKSON & SHARP CO., Wilminton, Del. }
BARNEY & SMITH MANUFACTURING CO., Dayton, O. }

The advantages derived from the use of such Special Colors are many, a few of which are found below:

ABSOLUTE UNIFORMITY OF SHADE. DURABILITY, as we use perfectly pure materials. **SAVING OF MONEY,** because of small quantity required. **SAVING OF TIME,** n he putting on of the same. **SAVING OF LABOR AND MATERIAL,** as no extra amount of Varnish will be required to hide a sanded surface **LARGER DEGREE OF CERTAINTY** hat there will be an absence of cracked work, as our mixtures are all uniform, being done by weight only.

We make any desired shade, it only being necessary that purchasers furnish us with sample of color desired, stating the time they would like to have the paint dry in.

We shall be glad to furnish samples and give prices to any who may wish to avail themselves of the above advantages.

Very respectfully

JOHN W. MASURY & SON, New York and Chicago.

Established 1856.

Shipman & Bolen, Manufacturers of fine

Railway Varnishes,

No. 352 Mulberry St., Newark, New Jersey.

BILLINGS, TAYLOR & CO.,

(INCORPORATED.)

Color Makers,

AND MANUFACTURERS OF

COACH AND CAR COLORS AND FINE VARNISHES.

N. Y. Office, 105 John Street. CLEVELAND, OHIO.

JAMES T. PATTEN,

RAILWAY EQUIPMENT.

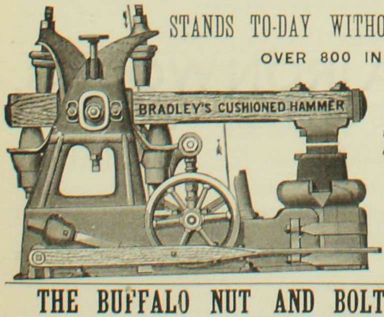
REPRESENTING THE

Wason Mfg. Co., of Springfield, Mass.
RAILWAY CARS, ETC.

Portland Company, of Portland, Me.
LOCOMOTIVES.

18 BROADWAY (Welles Building), NEW YORK.

BRADLEY'S CUSHIONED HAMMER



STANDS TO-DAY WITHOUT AN EQUAL.

OVER 800 IN USE.

It approaches nearer the action of the Smith's arm than any hammer in the world.

BRADLEY & CO.,

Syracuse, N. Y.

[Established 1832.

THE BUFFALO NUT AND BOLT COMPANY

(LIMITED),

MANUFACTURERS OF

Hot Pressed Nuts, Bolts, Washers, Rivets, Etc.,

NO. 226 OHIO STREET,

BUFFALO, N. Y.

Aug. Duckwitz President. Wm. F. Duckwitz V.P. and Manager. F. H. Duckwitz, Sec. and Treas.

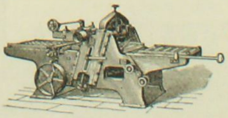
J. A. FAY & CO.,

BUILDERS OF

WOOD WORKING MACHINERY.

FOR
RAILROAD & CAR SHOPS,
NAVY YARDS
AND
ARSENALS,
BRIDGE SHOPS, ETC.

W. H. DOANE, Pres.
D. L. LYON, Sec'y.



FOR
CAR SILL DRESSING,
PLANING AND MATCHING
CAR GAINING,
CAR TENONING,
MOLDING, SHAPING,
MORTISING, BORING,
ETC., ETC., ETC.

CINCINNATI, OHIO, U. S. A.

NATIONAL CAR-BUILDER SUPPLEMENT

AND EXPORT EDITION,

Containing Complete Lists of the Street Railway Companies of the United States and Canada.

ALSO:

The Railways of Mexico, West Indies, Central and South America.

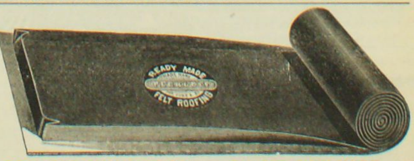
Free to all subscribers to the *National Car-Builder*, and to Railroad Officers.
To others 25 cents per copy.
Will be mailed on receipt of price

MORSE BUILDING, NEW YORK.

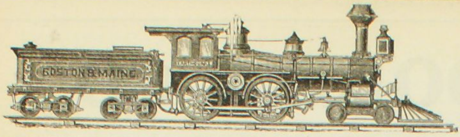
ROOFING.

A PERFECT JOINT.

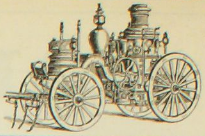
SEND FOR
Estimates
and
Samples.



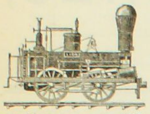
NEW YORK COAL TAR CHEMICAL CO. **Box 785, NEW YORK.**



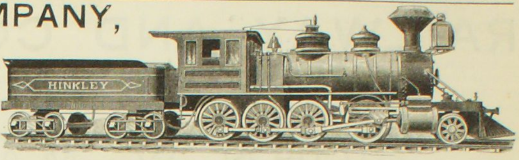
MANCHESTER LOCOMOTIVE WORKS,
MANUFACTURERS OF
LOCOMOTIVES,
AND THE
AMOSKEAG STEAM FIRE-ENGINE.
JOHN A. BURNHAM, President. WM. G. MEANS, Treas., Boston, Mass.
ARETAS BLOOD, Agent, Manchester, N. H.



HINKLEY LOCOMOTIVE COMPANY,
BOSTON, MASS.,
MANUFACTURERS OF
LOCOMOTIVE ENGINES
FOR ALL GAUGES.
Best workmanship and interchangeability of parts guaranteed.

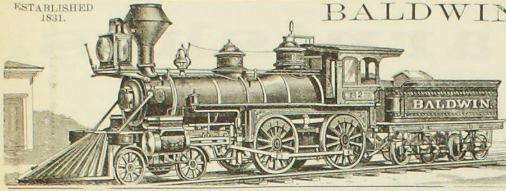


LION, 10 TONS, HINKLEY, 1839. GREELY S. CURTIS, Treas. FRANKLIN D. CHILD, Supt.

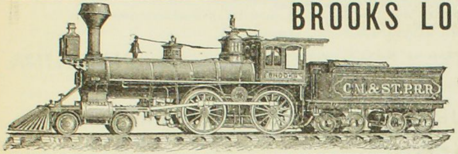


CONSOLIDATION, 52 TONS, HINKLEY LOCOMOTIVE COMPANY, 1882.

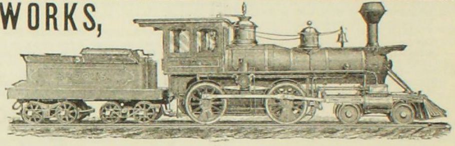
ESTABLISHED 1831.

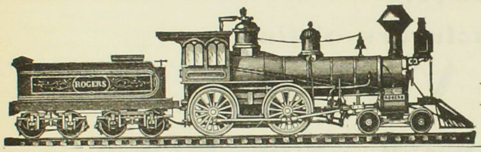


BALDWIN LOCOMOTIVE WORKS,
PHILADELPHIA, PA.
BURNHAM, PARRY, WILLIAMS & CO., PROPRIETORS,
GEO. BURNHAM, CHAS. T. PARRY, EDWARD H. WILLIAMS, MANUFACTURERS OF WM. P. HENSZEY, EDW. LONGSTRETH, JOHN H. CONVERSE.
LOCOMOTIVE ENGINES, CAPACITY 600.
Adapted to every variety of service, and built accurately to standard gauges and templates. Like parts of different engines of same class perfectly interchangeable.
Passenger and Freight Locomotives, Mine Locomotives, Narrow Gauge Locomotives, Steam Street Cars, etc.
Illustrated Catalogues furnished on application of customers. All work thoroughly guaranteed.



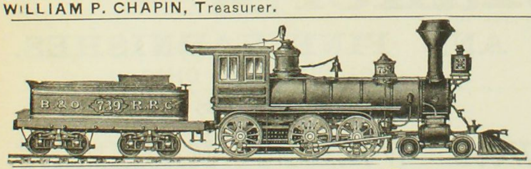
BROOKS LOCOMOTIVE WORKS,
DUNKIRK, N. Y.
Orders Solicited for Locomotives Adapted for Every Class of Railway Service.
H. G. BROOKS, Pres't and Supt.
M. L. HINMAN, Sec'y and Treas.



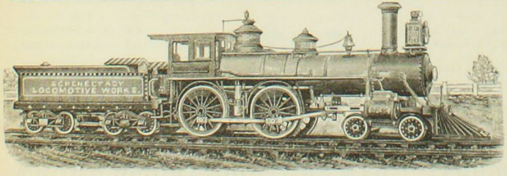


ROGERS LOCOMOTIVE AND MACHINE WORKS,
PATERSON, N. J.
New York Office, 44 Exchange Place.
Manufacturers of Locomotive Engines and Tenders and other Railroad Machinery
J. S. ROGERS, President.
R. S. HUGHES, Secretary. } PATERSON, N. J.
WM. S. HUDSON, Sup't.
R. S. HUGHES, Treas., 44 Exchange Place, New York.

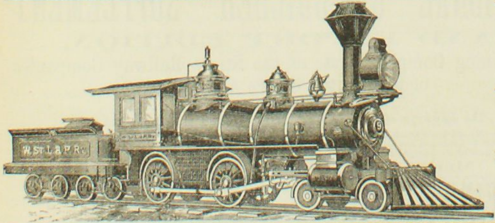
RHODE ISLAND LOCOMOTIVE WORKS,
PROVIDENCE, RHODE ISLAND.
EARL PHILIP MASON, Vice-President. CHARLES FELIX MASON, President. ARTHUR LIVINGSTON MASON, Secretary
WILLIAM P. CHAPIN, Treasurer. WILLIAM H. FENNER. Jr., Agent.



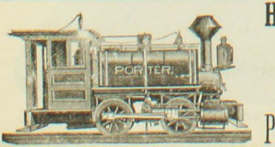
PITTSBURGH LOCOMOTIVE AND CAR WORKS.
PITTSBURGH, PA.
MANUFACTURERS OF
Locomotive Engines for Broad or Narrow Gauge Roads,
From standard designs, or according to specifications, to suit purchasers.
Tanks, Locomotive or Stationary Boilers Furnished at Short Notice
D. A. Stewart, Prest. D. A. Wightman, Supt. Wilson Miller, Sec. & Treas.



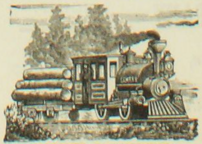
SCHENECTADY LOCOMOTIVE WORKS.
CHAS. G. ELLIS, President. EDWARD ELLIS, Treasurer.
WALTER McQUEEN, Vice-President.
SCHENECTADY, N. Y.



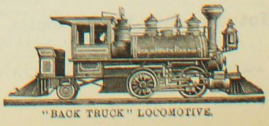
VIRGINIA IRON WORKS,
NORFOLK, VA.,
T. W. GODWIN & CO., - - - PROPRIETORS.
MANUFACTURERS OF
LOCOMOTIVE ENGINES FOR NARROW GAUGE ROADS. ADAPTED TO EVERY VARIETY OF SERVICE. BUILT ACCURATELY TO GAUGES AND TEMPLATES. LIKE PARTS OF ENGINES, SAME CLASS, INTERCHANGEABLE.
Lumbermens' Locomotives, Marine, Stationary and Agricultural Engines and Boilers.



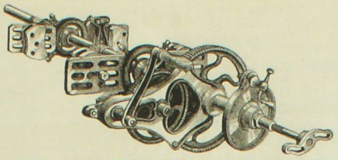
OUR-WHEEL-CONNECTING TANK LOCOMOTIVE.
H. K. PORTER & CO.,
PITTSBURGH, PA.



LOGGING LOCOMOTIVE
Builders of all Kinds of
LIGHT
Locomotives.
Send for Catalogue.



"BACK TRUCK" LOCOMOTIVE.



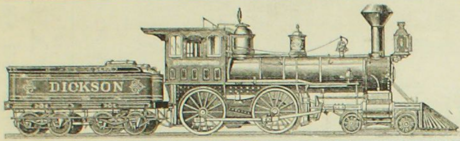
PATENT IMPROVED LOCOMOTIVE CYLINDER BORING MACHINE

Bars Made Any Size Required for any kind of Work.

Special Lathe Bars made with Self Feed.

New Descriptive Catalogue on Application.

L. B. FLANDERS
MACHINE WORKS
PEDRICK & AYER,
PROPRIETORS.
1025 HAMILTON ST., PHILADELPHIA.

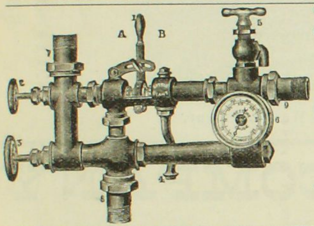


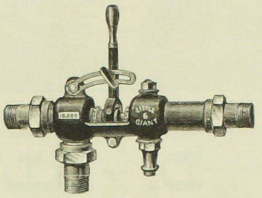
DICKSON MANUFACTURING CO.,
Scranton and Wilkes-Barre, Pa.,
MANUFACTURERS OF
LOCOMOTIVES FOR EVERY KIND OF SERVICE.

The different classes constructed according to standard gauges and templets, so that like parts are interchangeable and may be ordered by number.

MINING, HOISTING and PUMPING MACHINERY a specialty. Car Wheels, Forgings, and Machinery of all kinds. Specifications and plans furnished on application. General Office, Scranton, Pa.

H. M. BOIES, President. JAS. P. DICKSON, Vice-President. WM. H. PERKINS, Sec'y and Treas.
E. D. LEAVITT, Jr., M. E., Cambridgeport, Mass., Consulting Engineer.





LITTLE GIANT
BOILER
Testing Apparatus.

To Test Boilers with Warm Water.

Send for circulars and full particulars.

Rue's Little Giant Injector
GREATLY IMPROVED.

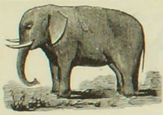
Adapted to every variety of service. Thoroughly interchangeable. Fully guaranteed.

SPECIAL INJECTOR FOR WASHING OUT BOILERS WITH HOT WATER.

10,850 now in use by over 210 Railroads.

EJECTORS A SPECIALTY.

RUE MFG. CO.,
906 FILBERT STREET,
PHILADELPHIA, PA



Phosphor Bronze

TRADE MARKS: "Phosphor-Bronze."

PHOSPHOR-BRONZE,
For Bearings of Locomotives, Cars and Machinery,
SLIDE VALVES, CYLINDER RINGS AND STEAM CONNECTIONS.
SAVES OIL AND REPAIRS, PREVENTS DELAY TO TRAINS, AND NEVER CUTS THE JOURNALS.

Pamphlets and particulars on application to
THE PHOSPHOR-BRONZE SMELTING CO., Limited,
Office, 512 Arch Street, Philadelphia, Pa.
Owners of the United States Phosphor-Bronze Patents. Sole Manufacturers of Phosphor-Bronze in the United States

A. A. THOMSON & CO.,
IMPORTERS AND DEALERS IN
RUSSIA SHEET IRON
For Locomotive Jackets and other Fine Work.

We sell the GENUINE imported article, which long experience has proved to be the most durab polished iron ever manufactured. It will not contract rust by mere exposure to the atmosphere

Tin and Roofing Plates especially adapted for Railroad Car Roofs,
Pig Tin, Zinc, Solder, Lead, Etc.
Nos. 213 and 215 WATER STREET, NEW YORK.

ANSONIA BRASS AND COPPER CO.,
MANUFACTURERS OF
PURE COPPER WIRE
FOR ELECTRICAL PURPOSES, BARE AND COVERED
SEAMLESS BRASS & COPPER
TUBING.
SHEETS, BOLTS, RODS,
WIRE, Etc., IN
BRASS AND COPPER

W. E. DODGE, Jr., Pres
G. P. COWLES, Vice-Pres. & Treas.
A. A. COWLES, Sec'y.

ANSONIA
REFINED INGOT COPPER,
"ANCHOR" AND "STAR" BRANDS.

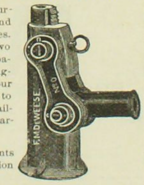
19 AND 21 CLIFF STREET, NEW YORK.
Factories at Ansonia Conn.

Boiler,
Locomotive
AND
Smoke Stack
STEELS.
Quality Unsurpassed. Plates up to 100 inches in width.

FIRE
BOX
STEEL.

Purity, Ductility and Softness.

SHOENBERGER & CO.,
PITTSBURGH, PA.

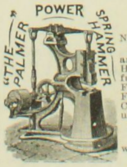


THE MOSHER LIFTING JACK.

Made of the best air-furnace malleable iron, and on scientific principles. Are used by about two hundred railroad companies. Seven sizes, ranging in capacity from four to twenty tons, suited to every department of railroad use and fully guaranteed.

Price-list and discounts furnished on application to manufacturer,

F. M. DEWEESE, Chillicothe, O.



THIS HAMMER
AWARDED THE FIRST PREMIUM OF A SILVER MEDAL
AT THE
American Institute Fair,
N. Y. CITY, NOV., 1873.

Superior in every point to any modification of the Trip Hammer. Simple, Powerful, Efficient and Cheap. Four sizes now being built. For Prices and Descriptive Circulars, address the manufacturers,

S. C. FORSAITH & CO.,
Manchester, N. H.,
who are also builders of the
Abbe Bolt-Heading Machine.

W. D. WOOD & CO.'S

PATENT PLANISHED SHEET IRON.

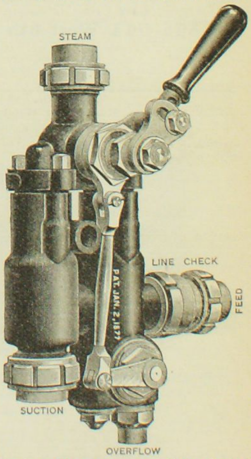
Patented March 14, 1865; April 8, 1873; Sept. 9, 1873; Oct. 6, 1874; Jan. 11, 1876.

Guaranteed fully equal, in all respects, to the
IMPORTED RUSSIA IRON,
And at a much less price.

LOCOMOTIVE JACKET IRON
Our Specialty.

For sale by all the principal Metal Dealers in the large cities throughout the United States, and at their office,

111 Water Street, Pittsburgh, Pa.



THE IMPROVED
HANCOCK INSPIRATOR
FOR
LOCOMOTIVES.

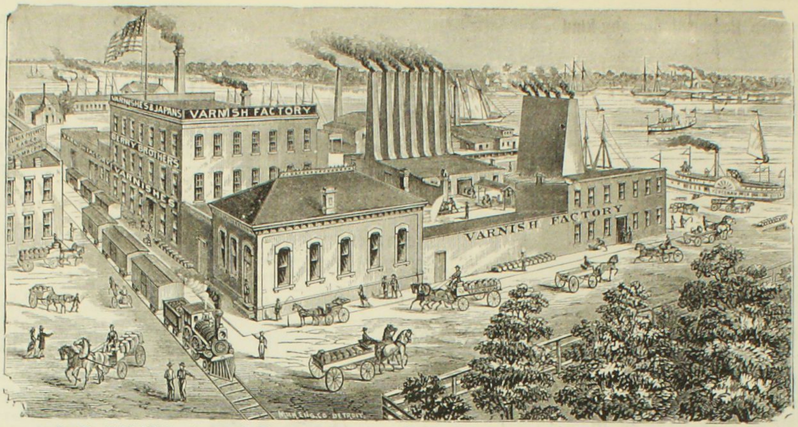
Send for Circulars and Full Particulars
to
THE HANCOCK INSPIRATOR CO.
34 BEACH STREET,
Boston, Mass.

HOWARD IRON WORKS.
BUFFALO N. Y.,
MANUFACTURERS OF
Schlenker's Automatic Revolving Die Bolt
Cutter and Nut Tapping Machine
SPECIALLY ADAPTED FOR RAILROAD USES

BERRY BROTHERS, DETROIT, MICH., MANUFACTURERS OF **RAILWAY VARNISHES.**

ESTABLISHED IN 1858.
USE BERRY BROTHERS'
RAILWAY VARNISHES.

Frontage on Wight Street, 218 ft.


VARNISHES & JAPANS
VARNISH FACTORY
BERRY BROTHERS
VARNISHES
VARNISH FACTORY

Frontage on Leib Street, 200 ft.

ESTABLISHED IN 1858.
USE BERRY BROTHERS'
RAILWAY VARNISHES.

B. R. MILLER, General Eastern Agent. W. L. EN EARL, General Western Agent.

THE E. D. ALBRO COMPANY,

DIRECT IMPORTERS OF

MAHOGANY

(Via New Orleans),

MANUFACTURED TO SIZES SPECIALLY ADAPTED FOR

CAR-BUILDERS.

MANUFACTURERS OF

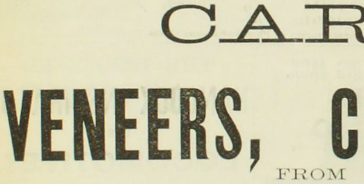
VENEERS, CAR-BUILDERS' MATERIAL

FROM DOMESTIC AND FOREIGN WOODS.

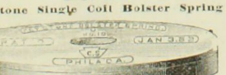
685--711 West 6th St., CINCINNATI, O.

Estimates and Price Lists Furnished.

NO. 19.
Keystone Single Coil Bolster Spring


KEYSTONE BOLSTER SPRING
NO. 19
PAT'D
JAN 3.82
C.S
PHILA. PA.

Patented Aug. 16th, 1881, and January 3d, 1882.
Capacity, 35000 Pounds Each.
Motion Very Soft and Slow.



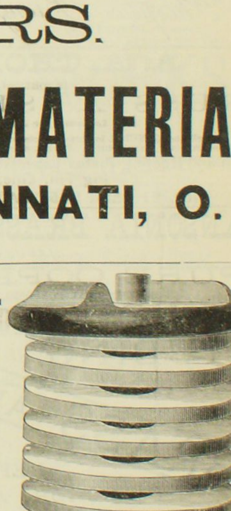
KEYSTONE CAR SPRING WORKS.

CHARLES SCOTT,

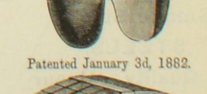
C. T. SCHOEN, Supt. MANUFACTURER OF

RAILWAY CAR SPRINGS,

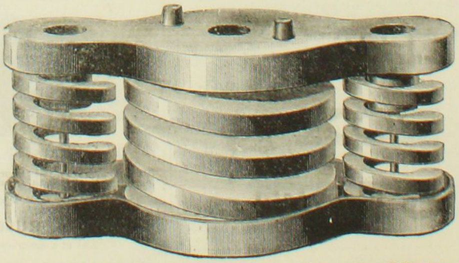
1028 to 1038 New Market Street,
PHILADELPHIA, PA.



Patented January 3d, 1882.



KEYSTONE GRADUATED BOLSTER SPRING
NO. 17.



Capacity 40000 Pounds Each—Motion Softer than Elliptics.
Patented August 16th, 1881 January 3d and March 21st 1882.

DIRECTORY

of the Railroads of the United States and Canada, showing the gauge, length of road, number of locomotives and number of cars; and giving the names and titles of their principal officers in charge of the operating, purchasing and rolling stock departments.

A

Adirondack R. R. 4-8½ gauge 60 m. 3 lo. 62 cars.
C. E. Durkee, *Supt*..........Saratoga, N. Y.
Jacob Myers, *M. M*..........Saratoga, N. Y.
Jas. J. Traver, *M. C. B*..........Saratoga, N. Y.
Alabama Great So'n R. R. (*See Cin., N. O. & T. P.*)
Albany & Susquehanna R. R. (*See D. & H. Canal Co.*)
Albert Ry. 4-8½ g. 51 m. 3 lo. 32 cars.
G. A. Robinson, *Manager*.... Hillsboro, N. B.
Jas. McKay, *M. M. & C. B*......Hillsboro, N. B.
Allegany Central R. R. 3 gauge 30 miles.
Geo. D. Chapman, *Gen. Man.*..Angelica, N. Y.
W. O. Chapman, *Gen. Supt*...Friendship, N. Y.
Allegheny Valley R. R. 4-9 g. 259 m. 70 lo. 2200 c.
David McCargo, *Gen. Supt. & Pur. Agt.*; and
C. B. Price, *Supt.* (Riv. Div.).....Pittsburg, Pa.
A. A. Jackson, *Supt.*(L.G. Div.).Reynoldsville,Pa.
Geo. W. Glass, *M. M*..........Verona, Pa.
R. Gunning, *M. C. B*.......... Verona, Pa.
Annapolis & Elk Ridge R. R. 4-8½ g. 20 m. 4 lo. 29 c.
W. H. Bians, *Supt. & Pur. Agt.*.Annapolis, Md.
John L. Beall, *M. Mach*.........Annapolis, Md.
Arkansas Midland R. R. 3-6 g. 48 m. 4 lo. 45 cars.
A. H. Johnson, *Pr. & Gen. Man*...Helena, Ark.
J. B. Johnson, *M. M. & M. C. B*...Helena, Ark.
Ashland Coal & Iron Ry. 4-8½ g. 30 m. 7 lo. 425 c.
Douglas Putnam, Jr., *Gen. Supt*..Ashland, Ky.
Robt. Peebles, *Pur. Agt*..........Ashland, Ky.
E. M. Roberts, *M. M*........ ....Ashland, Ky.
Ashtabula & Pittsburgh Ry. (*See Penna. Co.*)
Asheville & Spartanburg R. R. 5 g. 49 m. 2 lo. 12 c.
Jas. Anderson, *Supt. & Pur. Agt.*.Spart'b'g, S.C.
Wm. Platt, *M. M*..........Spartanburg, S. C.
W. B. Brown, *M. C. B*........Spartanburg, S. C.
Atchison, Topeka & Santa Fé. R. R.
4-8½ g. 1,900 m. 347 lo. 9,607 cars.
C. C. Wheeler, *Gen. Man*..........Topeka, Kan.
D. J. Chase, *Gen. Supt*..........Topeka, Kan.
W. W. Allen, *Asst. Supt*..........Topeka, Kan.
F. M. Smith, *Pur. Agt*.......... Topeka, Kan.
Geo. Hackney, *Supt. Lo. & Car. Dept.* do.
Clem. Hackney, *Asst. Sup. L. & C. Dept.* do.
Eastern Div.: D. J. Chase, *Supt.* ..Topeka, Kan.
Henry Hull, *G. F. Car Dept*.....Topeka, Kan
John Fagan, *M. M*..........Atchison, Kan.
J. M. Smith, *M. M*....... .Kansas City, Mo.
Alfred Taylor, *M. M*..........Emporia, Kan.
Mid. Div.: H. R. Nickerson, *Supt*.Nickerson, Kan.
W. Y. Johnson, *M. M*....... .Nickerson, Kan.
J. Q. Adams, *M. M*..........Dodge, Kan.
W. Div.: W. W. Borst, *Supt*.........La Junta, Col.
A. C. Stiles, *M. M*.......... La Junta, Col.
D. H. Dotterer, *M. M*..........Raton, N. M.
So. Div.: Geo. L. Sands, *Supt*......Las Vegas, N.M.
L. H. Waugh, *M. M*.........Las Vegas, N. M.
Rio G. Div.: Geo. L. Sands, *Supt.* Las Vegas, N.M.
J. H. Holman, *M. M*. ....Wallace, N. M.
J. W. Sager, *M. M*.........San Marcial, N. M.
H. P. Olcott, *M. M*..... .....Deming, N. M.
Atlanta & West Point R. R. (*See Western of Ala.*)
Atlantic & Pacific R. R. 4-8½ g. 286 m.
F. W. Smith *Gen. Supt*.....Albuquerque, N. M.
Geo. Chalender, *Div. Supt*..Albuquerque, N. M.
D. Hardy, *Div. Supt*.... ....Williams, Ar.
Geo. Chalender, *Supt. M. P. & M.* do.
D. B. Sibley, *Pur. Agt*..........Chicago, Ill.
Augusta & Knoxville R. R. 30 miles.
Gen. Supt & M. M...Augusta, Ga.

B

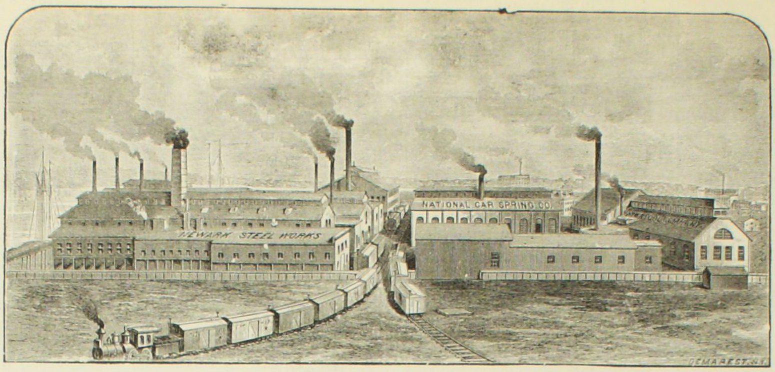
Baltimore & Ohio R. R.
4-8½ g. 1,539 m. 546 lo. 14,862 cars.
N. S. Hill, *Pur. Agt*..........Baltimore, Md.
E. Ohio Riv. Div. 4-8½ g. 972 m.
W. M. Clements, *Mast. Trans*...Baltimore, Md.
A. J. Cromwell, *Act. M. of M*....Baltimore, Md.
L. Packard, *M. C. B*.... .... ..Baltimore, Md.
I. N. Kalbaugh, *M. M*..........Baltimore, Md.
Wm. Edwards, *M. M*..Martinsburgh, W. Va.
Sam. Houston, *M. M*.......Piedmont, W. Va.
Robert Maxwell, *M. M*.......Cumberland, Md.
S. B. Crawford, *M. M*.. ......Grafton, W. Va.
Alex. Laird, *M. M*......Parkersburg, W. Va.
Chas. Hirsch, *M. M*... .....Wheeling, W. Va.
Pitts. Div.: T. M. King, *Gen. Supt*...Pittsburg, Pa.
J. E. Sampsell, *Asst. M. of M.* Connelsville, Pa.
Trans-Ohio Divs.: B. Dunham, *G. Man.* .Newark, O.
W. H. Harrison, *Asst. M. of Mach*..Newark, O.
E. L. Weisgerber, *M. M*...... ....Newark, O.
H. M. Ingler, *M. M*.. ....Bellaire, O.
O. B. Perkins, *M. M*..........Zanesville, O.
Andrew Beckert, *M. M*..........Sandusky, O.
F. J. Gunther, *M. M*.....Chicago Junction, O.
Chi. Div.: *Gen. Supt* ..Chicago, Ill.
Benj. Lowther, *M. M*.... ...... Garrett, Ind.
W. H. Wilkinson, *M. M* ... .. Kingston, Ill.
Baltimore & Philadelphia. 4-8½ g. 20 m. 4 lo. 35 c.
D. Connell, *Supt*..........Wilmington, Del.
Baltimore & Potomac R. R. (*See Penna. R. R.*)
Bangor & Piscataquis R. R. 4-8½ g. 63 m. 4 lo. 87 cars.
Arthur Brown, *Supt*. ....Bangor, Me.
C. S. Nason, *M. M* ....Bangor, Me.
J. W. Comins, *M. C. B*... .. ..Oldtown, Me.
Barclay R. R. 4-8½ g. 16 miles.
F. F. Lyon, *Supt*..........Barclay, Pa.
J. A. Hardenburg, *Pur. Agt*..21 Cort. st., N. Y.
Wm. Johnson, *M. M*..........Towanda, Pa.
Bedford, Springville, Owensburg & Bloomfield Ry.
3 g. 41 m. 5 lo. 65 cars.
Jas. W. Kennedy, *Gen. Supt. & Pur. Agt.*; and
Capt. Geo. Elliott, *M. M*..........Bedford, Ind.
Richard G. Elliott, *M. C. B*.......Bedford, Ind.
Bellaire, Zanesville & Cin. Ry. Co. 3 g. 42 m. 3 lo. 29 c.
S. J. Cochran, *Mast. Trans*.........Bellaire, O.
Bell's Gap R. R. 3 g. 23 m. 4 lo. 139 cars.
R. G. Ford, *Supt*..... .. .Bellwood (P. O.), Pa.
A. Zimmerman, *M. C. B*..........Bellwood, Pa.
Bennington & Rutland Ry. 4-8½ g. 9 m. 10 lo. 214 c.
F. C. White, *Supt. & Pur. Agt*..Bennington, Vt.
G. W. Blanchard, *M. M*..........Rutland, Vt.
Bingham, Canyon & Camp Floyd, and
Wasatch & Jordan Valley R. R.'s.
3 g. 44 m. 7 lo. 300 cars.
J. G. Kennedy, *Gen. Man*..Salt Lake City, Utah
Geo. M. Young, *Supt*...... do. do.
Bodie Lumber Co. 3 g. 34 miles.
Thomas Holt, *Supt. & Pur. Agt*.....Bodie, Cal
E. M. Luckett, *M. M. & C. B*........Bodie, Cal.
Boston, Barre & Gardner. 4-8½ g. 36 m. 7 lo. 107 c.
H. M. Witter, *Gen. Man*........Worcester, Mass.
Chas. F. Brigham, *M. M*......Worcester, Mass.
Boston, Concord, Montreal & White Mts. R. R.
4-8½ g. 167 m. 34 lo. 677 cars.
W. A. Stowell, *Supt*.... .Lake Village, N. H.
Geo. W. Storer, *Pur. Agt*.........Boston, Mass.
R. Adams, *M. M*.... .. ...Lake Village, N. H.
G. A. Ferguson, *Asst. M. M*...Lake Village, N. H.
L. D. Pickering, *M. C. B*....Lake Village, N. H.
Boston, Hoosac Tunnel & W'n Ry.
4-8½ g. 65 m. 18 lo. 1,038 cars.
H. L. Morrill, *Gen. Man*.......Saratoga, N. Y.
C. H. Cory, *Supt*..........Mechanicville, N. Y.
J. H. Wilder, *Pur. Agt*.....Mechanicville, N. Y.
C. H. Corey, *M. M* .. ..Mechanicville, N. Y.
John S. Ellis, *M. C. B*......Mechanicville, N. Y.
Boston, Revere Beach & Lynn R. R. 3 g. 9 m. 5 lo. 46 c.
L. C. Legro, *M. of Trans*...... ...Boston, Mass.
C. A. Hammond, *Supt. & P. Agt.* Boston, Mass.
J. L. Folsom, *M. M*..... ....Boston, Mass.
John Coghlan, *M. C. B*...... ....Boston, Mass.
Boston & Albany R. R. 4-8½ g. 372 m. 245 lo. 6,111 c.
W. H. Barnes, *Gen. Supt*... ..... Boston, Mass.
E. Gallup, *Asst. Supt*..........Springfield, Mass.
A. B. Underhill, *Supt. M. P*...Springfield, Mass.
F. D. Adams, *Gen. M. C. B*.......Allston, Mass.
H. B. Chesley, *Div. Supt*..... ..Boston, Mass.
G. H. Colby, *Div. M. M*.........Boston, Mass.
C. E. Grover, *Div. Supt*....Springfield, Mass.
H. W. Eddy, *Div. M. M*....Springfield, Mass.
J. B. Weston, *For. Car Sh.*.Springfield, Mass.
W. H. Russell, Jr., *Div. Supt.*E. Albany, N. Y.
T. B. Purvis, *Div. M. M*.. East Albany, N. Y.
J. E. Doran, *For. Car Sh.*..East Albany, N. Y.
Boston & Lowell R. R.
4-8½ g. 140 m. 73 lo. 1,231 cars.
C. H. Mellen, *Supt*..........Boston, Mass.
F. H. Nourse, *Pur. Agt*.... .....Boston, Mass.
J. F. Crockett, *Supt. T. & Mach*..Boston, Mass.
Boston & Maine R. R. 4-8½ g. 206 m. 89 lo. 2,100 c.
J. T. Furber, *Gen. Supt. & P. A*..Boston, Mass.
Geo. J. Fisher, *Pur. Agt*..........Boston, Mass.
Wm. Smith, *M. M*..... .. ..Boston, Mass.
D. C. Richardson, *M. C. B*.....Lawrence, Mass.
Boston & Providence R.R. 4-8½ g. 67 m. 52 lo. 1,006 c.
A. A. Folsom, *Gen. Supt*..........Boston, Mass.
Geo. Richards, *M. M*..........Roxbury, Mass.
Jno. Lightner, *M. C. B*........ .Roxbury, Mass.
Bradford, Bordell & Kinzua R. R. 3 g. 30 m. 6 lo. 80 c.
R. G. Taylor, *Gen. Man*..........Bradford, Pa.
John Delaney, *M. M. & C. B* . .Bradford, Pa.
Bradford, Eldred & Cuba R.R. (*See Tonawanda, etc.*)
Breakwater & Frankford R. R. (*See Junc. & Break.*)
Brighthope Ry. 3 g. 37 m. 3 lo. 193 cars.
Jas. R. Worth, *Supt*.... ......Richmond, Va.
A. Gary, *Supt. Way & Works*.Winterpock, Va.
Alex. Calder, *M. M*..........Chester, Va.
Brunswick & Western R. R. 5 g. 172 m. 13 lo. 170 c.
H. S. Morse, *Gen. Man*.........Brunswick, Ga.
R. D. Meader, *Supt*.. .. ..Brunswick, Ga.
Buff., N.Y. & Phila. Ry. 3 & 4-8½ g. 242 m. 48 lo. 3,500 c.
Oliver Watson, *Gen. Man*.........Buffalo, N. Y.
Geo. S. Gatchell, *Gen. Supt*......Buffalo, N. Y.
W. W. Halsey, *Asst. to G. Supt*..Buffalo, N. Y.
J. H. Poole, *Pur. Agt*..........Buffalo, N. Y.
Allen Vail, *Supt. M. P. & M*....Buffalo, N. Y.
Buff. Div.: J. T. Gardiner, *Supt*....Buffalo, N. Y.
Roch. Div.: R. M. Patterson, *Supt.*Rochester, N. Y.
N. G. Div.: J. W. Watson, *Supt*......Olean, N. Y.
Riv. Div.: A. Vandivort, *Supt*.....Buffalo, N. Y.
Pitts. Div.: E. H. Witter, *Supt*.... .Pittsburg, Pa.
Buff., Pittsburg & W'n R. R. 4-8½ g. 156 m. 33 l. 975 c.
O. Watson, *Gen. Supt. & Pur. Agt.* Buffalo, N. Y.
E. H. Witter, *Asst. Supt*..... .....Oil City, Pa.
H. J. Bookhammer, *M. M*..........Oil City, Pa.
John Monks, *M. C. B*.. .. ..Oil City, Pa.
Burlington, Cedar Rapids & Northern Ry.
4-8½ g. 713 m. 73 lo. 2,738 cars.
C. J. Ives, *Gen. Supt*.........Cedar Rapids, Ia.
Robt. Williams, *Supt*.........Cedar Rapids, Ia.
T. Stickney, *Pur. Agt*...... ...Cedar Rapids, Ia.
R. W. Bushnell, *M. M. & C.B.* Cedar Rapids, Ia.
Burlington & Lamoille R. R. 4-8½ g. 35 m. 4 lo. 64 c.
G. L. Linsley, *Gen. Man. & Supt.* Burlington, Vt.
F. G. Brownell, *M. M., M. C. B. & P. A.* do.
Burlington & Mo. Riv. R. R. (in Neb.) (*See C. B & Q.*)
Burlington & North-West'n Ry. 3 g. 38 m. 3 lo. 85 c.
John T. Gerry, *Supt*..........Burlington, Ia.
Burlington & Ohio River R. R.
Gen. Man. & Pur. Agt. Chicago, Ill.
J. K. Lape, *Supt. of Equip*..... ..Chicago, Ill.

C

California Southern R. R. 4-8½ g. 127 m. 13 lo. 301 c.
J. N. Victor, *Supt*..........National City, Cal.
Berkley Powell, *Mech. Supt*..National City, Cal.
Camden & Atlantic R. R. 4-8½ g. 79 m. 16 lo. 264 c.
W. N. Bannard, *Supt*..........Camden, N. J.
Rufus Hill, *M. M*.. ....Camden, N. J.
Samuel Wills, *M. C. B*.........Camden, N. J.
Canada Southern Ry. 4-8½ g. 403 m. 89 l. 3,367 c.
W. P. Taylor, *Gen. Man*.... .....Buffalo, N. Y.
A. F. Howland, *Pur. Agt*......St. Thomas, Ont.
Rob't Potts, *Gen. M. C. B*......St. Thomas, Ont.
Can. Div.: E. P. Murray, *Supt*..St. Thomas, Ont.
Robert Potts, *M. C. B*.......St. Thomas, Ont.
U. S. Div.: E. P. Murray, *Supt*. ....Detroit, Mich.
O. P. Dunbar, *M. M*...... Grosse Isle, Mich.
Canadian Pacific R. R. 4-8½ g. 551 m. 26 lo. 473 c.
W. C. Van Horne, *Gen. Man*...Winnipeg, Man.
Eastern Div. 240 m. 16 lo. 276 cars.
Archer Baker, *Gen. Supt*......Montreal, Can.
Tho. Irwin, *Mech. Supt*.......Brockville, Ont.
Western Div. 311 m. 10 lo. 207 cars.
J. M. Egan, *Gen. Supt*........Winnipeg, Man.
T. W. Shaughnessy, *Pur. Agt.* Winnipeg, Man.
F. C. Butterfield, *M. M. & M. C. B.* Winnipeg, Man.
Cape F'r & Yadkin Val. R. R. 4-8½ g. 47 m. 3 lo. 31 c.
J. S. Morrison, *Gen. Supt*....Fayetteville, N. C.
Isaac W. Clark, *M. M. & C. B*..Fayetteville, N. C.
Carolina Central R. R. (*See Ral. & Aug.*)
Carson & Colorado R. R. (*See Va. & Truckee*).
Catasauqua & Fogelsville. 4-8½ g. 25 m. 6 lo. 577 c.
C. W. Chapman, *Supt. & P. A.* Catasauqua, Pa.
J. Thomas, *M. M*....... ...Hokendauqua, Pa.
Chas. J. Holbach, *M. C. B*.....Catasauqua, Pa.
Central and South-Western Railroads (Ga.).
5 g. 975 m. 127 lo. 1,858 cars.
W. G. Raoul, *Pres*..........Savannah, Ga.
Wm. Rogers, *Gen. Supt*..........Savannah, Ga.
C. H. Carson, *Pur. Agt*.... ......Savannah, Ga.
Cen. Div.: D. D. Arden, *M. M*......Savannah, Ga.
John McCann, *M. M*... ....Augusta, Ga.
F. Devine, *For. C. Sh* ....Savannah, Ga.
So.-West'n Div.: W. F. Shellman, *Supt.* Macon, Ga.
D. M. Gugel, *M. M*..........Macon, Ga.
James A. Knight, *M. C. B*....... Macon, Ga.
Central R. R. of N. J. 4-8½ g. 544 m. 294 lo. 27,198 c.
W. W. Stearns, *Gen. Supt*..... Elizabeth, N. J.
B. W. Burnett, *Pur. Agt*......New York, N. Y.
Cen Div.: W. Woodcock, *M. M.* Elizabethport, N. J.
Geo. Hackett, *M. C. B*. ....Elizabethport, N. J.
C. G. Williams, *M. M*.........Jersey City, N. J.
John Alpaugh, *M. M*.........Phillipsburg, N. J.
Long Br. Div.: H. H. Nieman, *Supt.* Long Branch, N. J.
N. J. So. Div.: R. Blodgett, *Supt* ...Manchester, N. J.
Wm. Montgomery, *M. M*....Manchester, N. J.
Chas. N. Sawyer, *M. C. B*....Manchester, N. J.
Lehigh & Susquehanna Div.:
W. S. Polhemus, *Supt*. .. Mauch Chunk, Pa.
L. C. Brastow, *Supt. Mach*........Ashley, Pa.
Central R. R. of S. C. (*See Wil. & Wel.*)
Central Iowa Ry. 4-8½ g. 354 m. 49 lo. 1,959 cars.
D. N. Pickering, *Gen. Supt*...Marshalltown, Ia.
John Player, *M. M*. ....Marshalltown, Ia.
T. L. Seevers, *M. C. B*........Marshalltown, Ia.
Central Pac. R. R. 4-8½ g. 3,780 m. 269 lo. 7,277 c.
A. N. Towne, *Gen. Man*....San Francisco, Cal.
J. A. Fillmore, *Gen. Supt*...San Francisco, Cal.
R. H. Pratt, *A. G. Supt*.....San Francisco, Cal.
J. R. Watson, *Gen. Pur. Agt*..Sacramento, Cal.
A. J. Stevens, *Gen. M. M*.....Sacramento, Cal.
W. McKenzie, *Asst. G. M. M*..Sacramento, Cal.
Benj. Welch, *Gen. M. C. B*....Sacramento, Cal.
G. J. Turner, *Asst. G. M. C. B.* Sacramento, Cal.
Western: Visalia & Tulare Divs. and Northern Ry.
A. D. Wilder, *Supt*.........W. Oakland, Cal.
G. D. Welch, *M. M.* (W. Div.) W. Oakland, Cal.
W. B. Ludlow, *M. C. B.* (W. Div.) do.
S. Johnson, *M. M.* (T. Div.).......Tulare, Cal.
D. Rutherford, *M. M.* (N. Rd.).S. Vallejo, Cal.
Sacramento: Oregon Divs.; and Cal. Pac. R. R.
J. B. Wright, *Supt*. ....Sacramento, Cal.
M. W. Cooley, *M. M.* (*S. Div.*) Sacramento, Cal.
Truckee Div.: J. H. Whited, *Supt.* Wadsworth, Nev.
Geo. Gregg, *M. M*.......... Wadsworth, Nev.
Wm. McPherson, *F. Car Sh*..Wadsworth, Nev.
Humb't Div.: G. W. Coddington, *Supt.* Carlin, Nev.
W. F. Smith, *M. M*..........Carlin, Nev.
J. C. Doughty, *For. Car Sh*... ...Carlin, Nev.
Salt Lake Div.: A. G. Fell, *Supt*.....Ogden, Utah.
James Lamb, *M. M*.. ....Terrace, Utah.
A. Sherburne, *For. Car Sh* .....Ogden, Utah.
Los Angeles; and Yuma Divs. (So. Pac.):
E. E. Hewitt, *Asst. Supt*....Los Angeles, Cal.
James Velsir, *M. M*.........Los Angeles, Cal.
T. T. Gilleland, *For. Car Sh.* Los Angeles, Cal.
Arizona Divs (So. Pac.):
A. A. Bean, *Asst. Supt*..........Tucson, Ariz.
W. F. Smith, *M. M*.. .. ..Tucson, Ariz.
Rio Grande and El Paso Divs. (So. Pac.):
J. Campbell, *Ass't Supt*.......El Paso, Texas.
H. C. Standish, *For. Sh*.....El Paso, Texas.
Central Vermont R. R. 4-8½ g. 548 m. 132 lo. 2,522 c.
J. W. Hobart, *Gen. Supt*.........St. Albans, Vt.
J. M. Foss, *Asst. Gen. Supt. & M. M.* St. Albans, Vt.
No. Div.: I. B. Futvoye, *Supt*.....St. Johns, P. Q.
Rut. Div.: J. Burdett, *Supt*.. ....Rutland, Vt.
N. L. Davis, *M. M. & C. B*........Rutland, Vt.
Brat. Div.: E. F. Brooks, *Supt*...Brattleboro, Vt.
New London & No'n R. R. 143 m. 22 lo. 303 c.
C. F. Spaulding, *G. Supt. & P. A.* New London, Ct.
I. W. Dow, *M. M*..........New London, Ct.
S. O. Banks, *M. C. B*... ....New London, Ct.
Charleston & Savannah Ry. 5 g. 115 m. 17 lo. 98 c.
H. S. Haines, *Gen. Man*........ Savannah, Ga.
C. S. Gadsden, *Gen. Supt*.....Charleston, S. C.
H. A. Ulmo, *M. M*........... Savannah, Ga.
Charlotte, Columbia & Augusta R. R. (*See Rich. & D.*)
Chateaugay R. R. 3 g. 34 m. 6 lo. 125 cars.
A. L. Inman, *Gen. Man*.......Plattsburg, N. Y.
J. M. Davis, *Supt. & M. M*....Plattsburg, N. Y.
Chattaroi Ry. 4-8½ g. 43 miles 11 loco. 483 cars.
C. H. Rockwell, *Gen. Man. & P. A.* Ashland, Ky.
J. R. Martin, *M. M*... ....Ashland, Ky.
Joseph P. Burleigh, *M. C. B*.......Ashland, Ky.
Cheraw & Chester R. R. 3 g. 30 m. 3 lo. 38 cars.
W. H. Harding, *Pres. & Supt*.....Chester, S. C.
A. M. Manning, *M. M*...... ......Chester, S. C.
Cheraw & Darlington R. R. (*See Wil. & Wel.*)
Cheraw & Salisbury R. R. (*See Wil. & Wel.*)
John Postel, *Manager*...... .Cedartown, Ga.
C. E. Scruton, *M. M. & C. B*....Cedartown, Ga.
Chesapeake, Ohio & So.-W'n.
4-9 g. 398 m. 47 lo. 1,339 c.
D. W. C. Brown, *G. S. & Pur. Agt*..Louisville, Ky.
H. E. Huntington, *Pur. Agt*.....Louisville, Ky.
F. H. Britton, *Mast. Trans* ......Paducah, Ky.
G. A. Haggerty, *S. M. P. & M.* Elizabethtown, Ky.
Geo. Dickey, *M. M* ....Elizabethtown, Ky.
Chas. Daniels, *M. M*..........Paducah, Ky.
Chesapeake & Ohio Ry. 4-8½ g. 642 m. 133 l. 3,543 c.
C. W. Smith, *Gen. Man*.........Richmond, Va.
D. A. Sweet, *Asst. to Gen. Man.* Richmond, Va.
A. H. Wood, *Asst. Gen. Supt.*, Huntington, W. Va.
A. S. Emmons, *Pur. Agt*..... ..Richmond, Va.
John McFarland, *Supt. M. P*... Richmond, Va.
Eastern Div.: *Supt*..Richmond, Va.
J. N. King, *M. C. B*... ....Richmond, Va.
Hunt. Div.: W. P. Harris, *Supt*... Hinton, W. Va.
T. L. Chapman, *Asst. Supt. M. P.*, and
H. C. Bassinger, *M. C. B.* Huntington, W. Va.
Lex. Div.: J. D. Yarrington, *Supt*..Lexington, Ky.
Cheshire R. R. 4-8½ g. 80 m. 30 lo. 499 cars.
R. Stewart, *Gen. Man*.......... Keene, N. H.
H. H. Stone, *Pur. Agt*..........Keene, N. H.
F. A. Perry, *M. M* ....Keene, N. H.
A. E. Howard, *G. For. Car Sh*.. ..Keene, N. H.
Chester & Lenoir Ry. 3 g. 50 m. 3 lo. 23 cars.
James Mason, *Supt*... ....Yorkville, S. C.
T. P. Beard, *M. M*.......... ...Yorkville, S. C.
Chicago, B. & Kan. City Ry. 4-8½ g. 181 m. 9 lo. 130 c.
Robt. Law, *Gen. Supt*.......... .Keokuk, Ia.
W. H. Bartlett, *Act. M. M*.....Burlington, Ia.
Chicago, Burlington & Quincy R. R.
4-8½ g. 2,924 m. 521 lo. 18,955 cars.
T. J. Potter, *Gen. Man*... ....Chicago, Ill.
(1) C., B. & Q., East of Mo. Riv. 1,938 miles.
H. B. Stone, *Gen. Supt*..... ......Chicago, Ill.
Wm. Irving, *Pur. Agt*..........Chicago, Ill.
G. W. Rhodes, *Supt. M. P*. . .....Aurora, Ill.
Wm. Forsyth, *Mech. Eng*.... ......Aurora, Ill.
Ill. Divs.: J. D. Besler, *Supt*........Galesburg, Ill.
Chi. Div.: Geo. Alexander, *Supt*.....Aurora, Ill.
L. E. Johnson, *M. M*..........Aurora, Ill.
Galesburg Div.: F. C. Rice, *Supt.* Galesburg, Ill.
Robert Colville, *M. M*......... Galesburg, Ill.
St. L. Div.: S. E. Crance, *Supt*.....St. Louis, Mo.
A. Forsyth, *M. M*......... ...Beardstown, Ill.
Ia. & Mo. Divs.: *Supt*..Burlington, Ia.
East. Div.: O. E. Stewart, *Supt*..Burlington, Ia.
Joel West, *M. M*... ....Burlington, Ia.
Mid. Div.: J. B. Maxon, *Supt*.....Ottumwa, Ia.
West'n Div.: W. B. Ryder, *Supt*.... Creston, Ia.
C. W. Eckerson, *M. M*..........Creston, Ia.
(2) C., B. & Q., West of Mo. Riv. 935 miles.
G. W. Holdrege, *Gen. Supt*........Omaha, Neb.
Jas. M. Barr, *Pur. Agt*......... ..Omaha, Neb.
D. Hawksworth, *Gen. M. M*..Plattsmouth, Neb.
Bur. & Mo. Riv. & Neb. Ry. Divs.:
D. E. Thompson, *Supt*..... ...Lincoln, Neb.
E. Bignal, *M. M*..........Lincoln, Neb.
R. V. Div.: A. Campbell, *Supt*.....Hastings, Neb.
A. & N. Div.: J. McConniff, *Supt*...Lincoln, Neb.
Chicago, Milwaukee & St. Paul R. R.
4-8½ g. 4,383 m. 425 lo. 13,659 cars.
S. S. Merrill, *Gen. Man*........Milwaukee, Wis.
J. T. Clark, *Gen. Supt*..........Milwaukee, Wis.
J. T. Crocker, *Pur. Agt*........Milwaukee, Wis.
J. M. Lowry, *Gen. M. M*.......Milwaukee, Wis.
E. Fairbairn, *M. M*... ....Milwaukee, Wis.
John Bailie, *Supt. Car Dept*...Milwaukee, Wis.
(1) H. C. Atkins, *Asst. Gen. Supt*..Milwaukee, Wis.
Chi. Div.: S. J. Collins, *Supt* ... .Chicago, Ill.
La Crosse Div: W. G. Collins, *Supt.* Milwaukee, Wis.
C. Bluffs Div.: A. J. Earling, *Supt*.... Marion, Ia.
P. du C. & M. Pt. Divs:
R. B. Campbell, *Supt*.........Milwaukee, Wis.
(2) C. H. Prior, *Asst. Gen. Supt*..Minneapolis, Minn.
H. & D. Div.: M. W. Kellie, *Supt*. do.
J. O. Pattie, *M. M*...... Minneapolis, Minn.
Ia. & Minn. Div.: H. R. Williams, *Supt*. do.
So. Minn. & River Divs.:
C. W. Case, *Supt*.......... ....Dubuque, Ia.
Ia. & Da. Div.: G. W. Sanborn, *Supt.* Mason City, Ia.
S. Cy. & Da. Div.: J. Jackson, *Supt.* Sioux City, Ia.
F. H. Moulton, *M. M*............Yankton, Dak.
Dubuque Div.: C. W. Case, *Supt*....Dubuque, Ia.
S. Charnley, *M. M*........ .....Dubuque, Ia.
(3) D. A. Olin, *Asst. Gen. Supt*.........Racine, Wis.
So.-Wn. Divs.: D. L. Bush, *Supt*......Racine, Wis.
John Taylor, *M. M*. ....Racine, Wis.
E. A. Eddy, *M. C. B*.......... ...Racine, Wis.
Northern Div.: L. B. Rock, *Supt*..Milwaukee, Wis.
Wm. E. Kittredge, *M. C. B*..Milwaukee, Wis.
Chicago, Pekin & So.-Wn. R. R. 4-8½ g. 88 m. 8 lo. 455 c.
A. H. Crocker, *Rec*.... .. .. Joliet, Ill.
J. N. Chilson, *M. C. B*....... ......Streator, Ill.
Chicago, Rock Island & Pac. Ry.
4-8½ g. 1,381 m. 300 lo. 7,760 cars.
R. R. Cable, *V. P. & Gen. Man*....Chicago, Ill.
A. Kimball, *Gen. Supt*..........Chicago, Ill.
H. F. Royce, *Asst. G. Supt*.... ..Davenport, Ia.
F. A. Marsh, *Pur. Agt*..........Chicago, Ill.
T. B. Twombly, *Gen. M. M*... .....Chicago, Ill.
B. K. Verbryck, *Gen. M. C. B*......Chicago, Ill.
Ill. Div.: R. H. Chamberlin, *Supt*.....Chicago, Ill.
R. Biester, *M. M*..........Chicago, Ill.
Sam'l Pullman, *M. C. B*..........Chicago, Ill.
Ia. Div.: Jno. Given, *Supt* ... .Des Moines, Ia.
J. G. Crockett, *M. M*..........Stuart, Ia.
Jas. E. Morrill, *M. M*..........Davenport, Ia.
Chas. M. Leonard, *M. C. B*......Davenport, Ia.
So.-Wn. Div.: G. F. Walker, *Supt*.....Trenton, Ia.
R. O. Carscadin, *M. M*..........Trenton, Mo.
Chas. R. Best, *M. C. B*....... ....Trenton, Ia.
K. & Des. M. Div.: Jno. Given, *Supt*..DesMoines, Ia.
S. W. Wakefield, *M. M*..........Keokuk, Ia.
Henry Kummer, *M. C. B*..........Keokuk, Ia.
Chicago, St. Louis & New Orleans R. R.
4-8½ g. 571 m. 101 lo. 1,913 cars.
J. C. Clarke, *V. P. & G. Man*..New Orleans, La.
L. T. Brien, *Asst. Gen. Man*..New Orleans, La.
C. M. Sheafe, *Gen. Supt*... ..New Orleans, La.
H. B. Febiger, *Pur. Agt*...... New Orleans, La.
W. H. Purdy, *Supt. Mach*..McComb City, Miss.
Geo. W. Baxter, *M. C. B* ..McComb City, Miss.
So. Div.: E. D. Anderson, *Acting Supt*. do.
W. P. McKinley, *M. M*... McComb City, Miss.
No. Div.: J. G. Mann, *Supt*........Jackson, Tenn.
J. M. Keith, *M. M*..... ...... Jackson, Tenn.
J. F. White, *M. M*........ Water Valley, Miss.
Chicago, St. Louis & Pittsburg.
Jas. McCrea, *Man* ....Columbus, O.
Wm. Mullins, *Pur. Agt*..........Pittsburg, Pa.
E. B. Wall, *Supt. M. P*..........Columbus, O.
Chicago, St. Paul, Minneapolis & Omaha Ry.
4-8½ g. 1,146 m. 181 lo. 5,221 cars.
J. M. Whitman, *Gen. Supt*......St. Paul, Minn.
W. H. S. Wright, *Pur. Agt*......St. Paul, Minn.
Matt. Ellis, *M. M*.......... ...St. Paul, Minn.
H. L. Preston, *M. C. B*..........Hudson, Wis.
Ea. & No. Div.: A. A. Hobart, *Supt.* St. Paul, Minn.
St. P. and S. C. Div.:
H. Spencer, *Supt* ....St. James, Minn.
H. C. Anderson, *Gen. For. Sh*.... Sioux Cy, Ia.
Neb. Div.: G. V. Morford, *Supt*......Omaha, Neb.
Chicago, Texas & Mexican Central Ry.
4-8½ g. 52 m. 4 lo. 60 cars.
Gen. Supt..... ....Dallas, Tex.
Chas. Howard, *Pur. Agt*.......... Chicago, Ill.
Chicago & Alton R. R. 4-8½ g. 840 m. 213 lo. 6,148 c.
C. H. Chappell, *Gen. Man*.........Chicago, Ill.
W. F. Merrill, *Gen. Supt*.......... Chicago, Ill.
A. V. Hartwell, *Pur. Agt*...... ....Chicago, Ill.
Wm. Wilson, *Supt. of Mach*...Bloomington, Ill.
Jos. Townsend, *G. For. Car Dept*. do.
Chi. Div.: A. M. Richards, *Supt*..Bloomington, Ill.
St. Louis Div.: S. D. Reeves, *Supt*..Roodhouse, Ill.
Wm. McPhail, *M. M*............ ....Slater, Mo.
Chicago & Atlantic.
J. Condit Smith, *Gen. Man*....... Chicago, Ill.
J. C. Williams, *Gen. Supt*....... ..Chicago, Ill.
East. Div.: J. H. Tinney, *Supt*. Huntington, Ind.
West. Div.: J. H. Parsons, *Supt*. . Chicago, Ill.
R. C. Ackley, *M. M*.........Huntington, Ind.
J. L. Adams, *M. C. B*......Huntington, Ind.
Chi. & East'n Ill. 4-8½ g. 248 m. 56 lo. 3,500 cars.
O. S. Lyford, *Gen. Supt*............Chicago, Ill.
D. R. Patterson, *Pur. Agt*... ......Chicago, Ill.
P. W. Drew, *M. Trans*..............Chicago, Ill.
Allen Cooke, *M. M*.............. ...Danville, Ill.
Chicago & Grand Trunk Ry. (*See Grand Trunk.*)
Chicago & Iowa R. R. 4-8½ g. 104 m. 16 lo. 237 cars.
T. J. Potter, *Gen. Man*.... ....Chicago, Ill.
W. H. Holcomb, *Gen. Supt*........Rochelle, Ill.
H. S. Bryan, *M. M*..... .... Aurora, Ill.
Chicago & Northwestern Ry.
4-8½ g. 3,476 m. 558 lo. 18,685 cars.
Marvin Hughitt, *2d V. Prs. & G. M.* Chicago, Ill.
J. D. Layng, *Gen. Supt*............Chicago, Ill.
R. W. Hamer, *Pur. Agt*. .... .Chicago, Ill.
Geo. W. Tilton, *Supt. M. P. & M.*; and
J. M. Boon, *A. Supt. M. P. & M*.. .Chicago, Ill.
Wis. and Mil. Divs. & Sheboygan & W'n Ry.:
Chas. D. Gorham, *Supt*.... ......Chicago, Ill.
Gal. Div.: Chas. Murray, *Supt*....... Chicago, Ill.
Pen'r Div.: W. B. Linsley, *Supt*....Escanaba, Mich.
Geo. H. White, *M. M*....... Escanaba, Mich.
Mad. Div.: C. A. Swineford, *Supt*..Baraboo, Wis.
Win. & St. P. Div.: S. Sanborn, *Supt.* Winona, Minn.
W. A. Scott, *M. M*.... ....Winona, Minn.
Dak. Cen. Ry.: W. F. Fitch, *Supt* ....Huron, Dak.
Ia. Div.: M. Hopkins, *Supt*..........Clinton, Ia.
Geo. W. Lowe, *M. M. & M. C. B.* Clinton, Ia.
No. Ia. Div.: H. G. Burt, *Supt*.... Eagle Grove, Ia.
Chicago & West Michigan:
4-8½ g. 409 m. 43 lo. 1,345 cars.
Geo. C. Kimball, *V. P. & G. Man.* Muskegon, Mich.
, *Gen. Supt* ....Muskegon, Mich.
Edw. Hill, *Pur. Agt*... ....Muskegon, Mich.
W. F. N. Davis, *M. M*.........Muskegon, Mich.
Cincinnati, Columbus & Hocking Val. Ry.
4-9 g. 25 m. 1 lo. 27 cars.
D. P. Hyatt, *Gen. Man*... .. ..Dayton, O.
Geo. F. Robinson, *Supt*. ...... Washington, O.
Cin., Georgetown & Portsmouth. 3 g. 35 m. 2 lo. 39 c.
M. Simmons, *Supt*..............Cincinnati, O.
J. C. Homer, *M. M*. . ...Cincinnati, O.
Cincinnati, Green Riv. & Nashville R. R. 3 g.
A. C. Sim, *Supt*..........King's Mountain, Ky.
G. Brashears, *Pur. Agt*......... Cincinnati, O.
Cincinnati, Hamilton & Dayton R. R.
, *Gen. Supt*......Cincinnati, O.
John Black, *Gen. M. M*... .... Lima, O.
W. H. H. Allison, *M. C. B*........Cincinnati, O.
C. R. & C. Div.: W. S. Brewer, *M. M.* Richm'd, Ind.
Cincinnati, Indianapolis, St. Louis & Chicago Ry.
4-8½ g. 370 m. 71 lo. 3,279 cars.
J. W. Sherwood, *Supt*.... ...Indianapolis, Ind.
Geo. Tozzer, *Pur. Agt*...... .....Cincinnati, O.
J. S. Patterson, *M. of Mach. & M. C. B.* Cincinn., O.
Cincinnati, New Orleans & Texas Pacific Ry. Co.
5 g. 841 m. 123 lo. 2,687 cars.
John Scott, *V. Pres. & Gen. Man*..Cincinnati, O.
Richard Carroll, *Gen. Supt*.......Cincinnati, O.
R. W. Healey, *Gen. Pur. Agt*.....Cincinnati, O.
James Meehan, *Gen. M. M*... ...Cincinnati, O.
Cin. So. Div.:
I. W. Fowle, *M. M*............Cincinnati, O.
John Richardson, *M. C. B*......Cincinnati, O.
A. Thomson, *M. M*... ...Chattanooga, Tenn.
Ala. Gr. S'n Div.: C. B. Wallace, *Gen. Supt*.. and
George Manuell, *M. M*....Chattanooga, Tenn.
Fred Morgan, *M. C. B*...Chattanooga, Tenn
V. & M. Div.: E. F. Raworth, *G. S.* Vicksburg, Miss
James B. Browne, *M. M*.....Vicksburg, Miss.
V. S. & P. Div.: F. Y. Dabney, *Supt*..Monroe, La.
W. Bell Smith, *M. M. & C. B*....Monroe, La.
Cincinnati Northern Ry. 3 g. 30 m. 4 lo. 60 c.
G. L. Barringer, *Gen. Man*.. .... Cincinnati, O.
T. J. Hamer, *M. M. & C. B*.......Cincinnati, O.
Cincinnati, Selma & Mobile R. R. 5 g. 71 m. 6 lo. 135 c.
D. McLaren, *Supt*...... ....Selma, Ala.
H. L. Wright, *Pur. Agt*.............Selma, Ala.
J. M. Levis, *M. M*..................Marion, Ala.
Cin., Wash. & Balt. 4-8½ g. 312 m. 65 lo. 1,422 cars.
Jas. H. Stewart, *Gen. Man*....... Cincinnati, O.
Edw. Evans, *M. M*........... ....Chillicothe, O.
T. G. Duncan, *Supt. C. D*...... .....Zaleski, O.
Cin., Wabash & Mich. Ry. 4-8½ g. 165 m. 13 lo. 290 c.
Norman Beckley, *Gen. Man. & P. A.* Elkhart, Ind.
O. W. Lamport, *Supt*..............Wabash, Ind.
S. B. Tinker, *M. M. & M. C. B*....Wabash, Ind.
Cincinnati & Eastern Ry. 3 g. 76 m. 4 lo. 66 cars.
S. Woodward, *Gen. Man*.... .. .Cincinnati, O.
P. W. Naughton, *M. M*...........Cincinnati, O.
Clarksburg, Weston & Glenville R. R.
3 g. 26 m. 3 lo. 28 cars.
A. H. Kunst, *Pres. and Gen. Man.* Weston, W. Va.
Sam. A. Steel, *M. M*............Weston, W. Va.
F. Dillie, *M. C. B*....... .. ....Nottingham, O.
Cleveland, Columbus, Cincinnati & Indiana and Indianapolis & St. Louis Rys. and Dayton & Union R. R. 4-8½ g. 780 m. 246 lo. 7,082 cars.
E. B. Thomas, *Gen. Man*.........Cleveland, O.
J. L. Yale, *Pur. Agt*.......... ....Cleveland, O.
W. F. Turreff, *Gen. M. M*.........Cleveland, O.
W. W. Wallace, *Div. M. M*....... Delaware, O.
Col. & Cin. Div.: Robt. Blee, *Supt* .Cleveland, O.
W. L. Gilmore, *M. M*..........Cleveland, O.
A. G. Steinbrenner, *G. For. Car Dept*. do.
Ind'p'lis Div.: John O. Ewan, *Supt*..Ind'polis, Ind.
J. K. Lape, *M. M*.............Brightwood, Ind.
N. Mark, *G. For. Car Dept.* Brightwood, Ind.
Ind. & St L Ry.: Tho. Burrows, *Supt.* St. Louis, Mo.
T. W. Ranson, *M. M. & C. B*.... Mattoon, Ill.
Day. & Un. Rd.: J. H. Barrett, *Supt.* Cincinnati, O.
H. S. Gordon, *M. M*.... ....Dayton, O.
Cleveland, Mt. Vernon & Delaware R. R.
4-9 g. 144 m. 22 lo. 751 c.
N. Monsarrat, *Gen. Supt*...............Akron, O.
G. M. Taylor, *M. M. & C. B*..... Mt. Vernon, O.
Cleve., Youngstown & Pitts. R. R. 3 g. 30 m. 3 lo. 112 c.
D. T. Lumley, *Gen. Supt*.. ....Alliance, O.
C. H. Dorman, *M. M. & M. C. B*....Alliance, O.
Cleveland, Lorain & Wheeling Ry.
4-8½ g. 158 m. 23 lo. 1,522 cars.
Oscar Townsend, *Gen. Man* ......Cleveland, O.
Wm. Thornburg, *Supt*... .... Lorain, O.
Cleve. & Marietta R. R. 4-8½ g. 99 m. 9 lo. 157 cars.
S. C. Baldwin, *Gen. Man* . ... Marietta, O.
M. D. Woodford, *Gen. Supt*........Marietta, O.
R. B. Hoover, *Pur. Agt*..... . .....Marietta, O.
O. P. Dunbar, *Gen. M. M* .. ..Norwalk, O.
A. Galloway, *M. M* .... Cambridge, O.
Cleveland & Pittsburg R. R. (*See Penna. Co.*)
Coburg, Peterborough & Marmora Ry.
5-6 g. 47 m. 5 lo. 207 cars.
Jas. R. Barber, *Gen. Supt*... ....Cobourg, Ont.
Jas. Clark, *M. M*... .... Cobourg, Ont.
John Tinney, *M. C. B*....... ....Cobourg, Ont.
Columbia & Greenville R. R. (*See Rich. & Dan.*)
Columbus, Hocking Valley & Toledo Ry.
4-9 g. 319 m. 90 lo. 7,257 cars.
M. M. Greene, *Gen. Man*...........Columbus, O.
G. R. Carr, *Gen. Supt*..............Columbus, O.
W. M. Greene, *Pur. Agt*.......... Columbus, O.
Ira G. Hutchins, *M. M*....... ....Columbus, O.
J. M. Rockafield, *M. C. B*....... Columbus, O.
Tol. Div.: M. T. Seymour, *Supt*......Columbus, O.
Hock. V. Div.: M. P. L. Booth, *Supt.* Columbus, O.
Ohio Riv. Div.: C. D. Norris, *Supt*.......Logan, O.
Columbus & Maysville Ry. (*See Cin. & East.*)
Columbus & Rome R. R. 3 g. 33 m. 2 lo. 25 cars.
M. E. Gray, *Supt* .... .Columbus, Ga.
Columbus & Western Ry. 5 g. 80 m. 2 lo. 19 cars.
E. A. Llewellen, *Gen. Man*. ...Columbus, Ga.
R. A. Bridges, *M. M* ....Opelika, Ala.
Concord R. R. 4-8½ g. 141 m. 37 lo. 1,010 cars
H. E. Chamberlain, *Supt. & P. Agt.* Concord, N. H.
J. T. Gordon, *M. M. & C. B*... .Concord, N. H.

BENJAMIN ATHA, Treasurer. RICHARD VOSE, President.

We make our own Steel for Car Springs.


NEWARK STEEL WORKS
NATIONAL CAR SPRING CO.
DEMAREST N.Y.

The Largest Crucible Cast-Steel Works in the Eastern States.

Spring Manufactory and Steel Works, Newark, N. J.

NATIONAL CAR SPRING COMPANY,

MANUFACTURERS OF

Elliptic, Volute-Spiral Hebbard, Oval, Round Bar, Rectangular-Passenger & Freight Car Springs

OFFICE, 13 BARCLAY STREET, NEW YORK.

STANDARD JOURNAL BEARINGS,

LEAD-LINED, SELF-FITTING.

Adopted by the Leading Railways in this Country and Canada.

MANUFACTURED, SOLD AND GUARANTEED BY

D. A. HOPKINS, Patentee, 113 Liberty St., New York.

FOUNDRIES: JERSEY CITY, N. J.

☞ In the patent fight between "LeRoy" and "D. A. Hopkins," an emphatic decision in favor of "Hopkins" was rendered January 3d, 1883.

POLAR GREASE NO. 1.

After years of practical experience in manufacturing HOT BOX CURES AND JOURNAL LUBRICANTS, we do not hesitate to stake our reputation on the statement that

POLAR GREASE NO. 1 POSSESSES MORE MERIT AS A

HOT BOX CURE,

And yields a greater mileage as a JOURNAL LUBRICANT than any compound now sold.

FOR HOT BOX CURE, apply to journal under all circumstances, and in similar manner as when tallow is used—it will do a better service.

FOR JOURNAL LUBRICANT, thoroughly incorporate the grease with W. Va. Oil, till it is sufficiently fluid for conveniently pouring into boxes or saturated waste in buckets. So prepared, the compound makes a cheap lubricant, a safeguard against heating journals, nets a large reduction in mileage cost, and a saving in brasses, the latter alone—paying the cost of Grease.

CORRESPONDENCE REQUESTED.—We invite trial orders with the greatest confidence, guaranteeing satisfaction in every particular, or no sale. Respectfully,

INLAND OIL COMPANY,
CINCINNATI and ST. LOUIS.

WILSON, WALKER & CO.
(LIMITED),
MANUFACTURERS OF ALL KINDS OF
RAILROAD CAR AND LOCOMOTIVE FORGINGS,
PITTSBURGH, PA.

WHITE LEAD.

JEWETT & SONS PERFECTLY PURE WHITE LEAD TRADE MARK

We have made but ONE QUALITY of WHITE LEAD for the last twenty-five years. It is ground in Refined Linseed Oil, and warranted perfectly pure.

THE JEWETT WHITE LEAD CO.,
28 BURLING SLIP, NEW YORK.

LINSEED OIL.

J. A. DEAN & CO. PERFECTLY PURE LINSEED OIL

All Linseed Oil bearing the above brand delivered by us is of OUR OWN MANUFACTURE, and guaranteed absolutely pure.

Our BOILED OIL will be POSITIVELY BOILED.

J. A. DEAN & CO.,
181 FRONT STREET, NEW YORK.

Conn. Riv. and Ver. Val. R. Rs. 4-8½ g. 130 m. 33 lo. 456 c.
J. Mulligan, *Supt. & Pur. Agt.* Springfield, Mass
W. H. Stearns, *M. M.*........ Springfield, Mass
Robert Hitchcock, *M. C. B.*... Springfield, Mass
Connotton Valley R. R. 3 g. 160 m. 26 lo. 896 cars.
Samuel Briggs, *Gen. Man.*.... ..Canton, O
B. C. Bosworth, *M. M.*............. Canton, O.
Cornwall R. R.. 4-8½ g. 9 m 5 lo. 166 cars
Frank Donahue, *G. Supt. & M. M.* Lebanon, Pa.
Levi Blouch, *M. C. B* .... Lebanon, Pa.
Credit Valley Ry. 4-8½ g. 184 m. 22 lo. 535 cars.
James Ross, *Gen. Supt*..... .....Toronto, Ont.
John Macnab, *Pur. Agt*..... .....Toronto, Can.
H. G. Taylor, *Mech. Supt* ......Toronto, Can
Crown Point Iron Co. R. R. 3 g. 13 m.
A. L. Inman, *Gen. Man*...... Plattsburg, N. Y.
J. M. Davies, *Supt. & M. M.*. Crown Point, N. Y.
J. C. Sherman, *M. C. B*..... Crown Point, N. Y.
Cumberland Valley R. R. 4-9 g. 125 m. 21 lo. 430 cars.
J. F. Boyd, *Supt*...... .....Chambersburg, Pa.
A. S. Hull, *M. M.*......... ..Chambersburg, Pa.
C. Wicke, *M. C. B.*...... ...Chambersburg, Pa.
Cumberland & Penn. R. R. 4-8½ g. 55 m. 28 lo. 625 c.
P. L. Burwell, *Gen Supt & P A.* Cumberland, Md.
N. W. Howson, *Mast. of Mach.* Mt. Savage, Md.
Nathan Binix, *M. C. B*..... ...Mt. Savage, Md.

D

Danbury & Norwalk R. R. 4-8½ g. 33 m. 6 lo. 100 c
L. W. Sandiforth, *G. Supt. & P. A.* S. Norwalk, Ct.
N. M. George, *M. M. & C. B*.... Danbury, Conn.
Danville, Mocksville & So.-Wn. R. R. 3 g. 28 m.
H. W. Goodrich, *Ch. Eng*..... Leakesville, N. C.
Danville, Olney & O. R. R.R. 4-8½ g. 110 m. 4 lo. 83 c.
Chas. Howard, *Rec. & Man*.......... Olney, Ill.
J. M. Graham, *Supt*.......... .....Kansas, Ill.
Louis Parisoe, *M. M. & C. B*.. ......Kansas, Ill.
Dayton & Union R. R. (*See Ohio Ry.*)
Del., Lackawanna & W. and N. Y., Lack. & W. R. Rs.
4-8½ g. 670 m. 348 lo. 26,187 cars.
Wm. F. Halstead, *Gen. Supt*.. ...Scranton, Pa.
G. W. B. Cushing, *Pur. Agt*. . New York, N. Y
Walter Dawson, *Mast. of Mach*... Scranton, Pa.
Robt. McKenna, *M. C. B* ....Scranton, Pa.
Bloomsb'g Div.: C. Graham, *M. M.*. Kingston, Pa.
Utica Div.: A. C. Salisbury, *Supt*.... Utica, N. Y.
Thos. Thatcher, *M. M* ....Utica, N. Y.
Morris & Essex Div.; Sussex; P. & D. and C. R. Rs.
A. Reasoner, *Supt*..... ....Hoboken, N. J.
W. H. Lewis, *M. M*.......... Kingsland, N. J.
J. W. Baker, *Mast. Car Rep*. .... Dover, N. J.
Oswego & Syracuse Div.:
W. B. Phelps, *Supt*............ Oswego, N. Y.
Jas. Buchanan, *M. M*. .. Syracuse, N. Y.
Syracuse, Binghamton & New York R. R.
4-8½ g. 81 m. 20 lo. 598 cars.
W. K. Niver, *Gen. Supt* .. ...Syracuse, N. Y.
Jas. Buchanan, *M. M*......... Syracuse, N. Y.
Delaware, Maryland & Virginia R. R.
4-8½ g. 101 m. 7 lo. 145 cars.
Tho. Groom, *Supt*..... ....Lewes, Del.
Geo. Messick, *M. M*.................. Lewes, Del.
W. H. Virden, *M. C. B*............... Lewes, Del.
Delaware & Hudson Canal Co.
4-3 and 4-8½ g. 596 m. 151 lo. 9,248 cars.
C. F. Young, *Gen. Man*......... Honesdale, Pa.
C. F. Young, *Pur. Agt*... .... Albany, N. Y.
R. C. Blackall, *Supt. of Mach*..... Albany, N. Y
Susq. Div.: C. D. Hammond, *Supt*. Albany, N. Y.
C. A. Jones, *M. M*............... Oneonta, N. Y.
J. R. Skinner, *M. C. B*. .... Oneonta, N. Y
Sar. & Ch. Divs.: T. Voorhees, *Supt*... Troy, N. Y.
J. L. Corey, *M. M*......... Green Island, N. Y.
Chr. Körner, *M. C. B*..... Green Island, N. Y.
Pa. Div.: R. Manville, *Supt & Pur Agt* and
S. H. Dotterer, *M. M*.... ...Carbondale, Pa.
T. Orchard, *M. C. B*......... Carbondale, Pa.
Denver & New Orleans. 4-8½ g. 140 m 11 lo. 400 c.
C. W. Fisher, *Gen. Man*............ Denver, Col.
Chas. Wheeler, *Pur. Agt* ... .Denver, Col.
S. P. Weller, *M. M. & M. C. B*.... Denver, Col.
Denver & Rio Grande Ry. 3 g. 1,062 m. 170 lo. 4,617 c
D. C. Dodge, *Gen. Man*.............. Denver, Col.
R. B. Cable, *Gen. Supt* ... .Denver, Col.
Henry Wood, *Supt. Utah Lines*. S. L. City, Utah.
A. B. Garner, *Pur. Agt*... . . ..Denver, Col.
N. W. Sample, *M. M*........ .. ...Denver, Col.
1st Div.: W. H. Bancroft, *Supt*.... S. Pueblo, Col.
2d Div.: Cole Lydon *Supt*. ... .. Alamosa, Col.
3d Div.: G. W. Cook, *Supt* .... Leadville, Col
4th Div.: R. M. Ridgway, *Supt*....... Salida, Col.
5th Div.: J. A. Myers
Des Moines & Ft. Dodge. 4-8½ g. 143 m. 13 lo. 232 c.
C. N. Gilmore, *Supt* .... Des Moines, Ia.
John McGrayel, *M. M*...... Grand Junction, Ia.
E. A. Avery, *M. C. B* ... ...Grand Junction, Ia.
Det., Gr. H. & Mil. Ry. 4-8½ g. 189 m. 36 lo. 478 c.
G. R. Nash, *Gen. Man* .... Detroit, Mich.
John S. Lorimer, *Storekeeper*.... Detroit, Mich.
W. J. Morgan, *Supt* ....Detroit, Mich.
F. Parker, *Mech. Supt*.......... Detroit, Mich.
Det., Lansing & No'n R. R. 4-8½ g. 222 m. 84 lo. 1027 c
John B. Mulliken, *Gen. Man*..... Detroit, Mich.
Allan Bourn, *Pur. Agt*............ Detroit, Mich.
Thos. M. Fish, *Gen. Supt*............ Ionia, Mich.
G. C. Watrous, *M. M. & C. B* ...... Ionia, Mich.
Det., Mack. & Marq. R. R. 4-8½ g. 151 m. 16 lo. 1112 c.
D. McCool, *Gen. Supt & P. A.* Marquette, Mich.
John Wilson, *Mech. Supt*...... Marquette, Mich.
Dorchester & Delaware R. R. 4-8½ g. 33 m.
Thos. E. Wright, *Supt*......... Cambridge, Md.
Dubuque & Dakota R. R. 4-8½ g. 64 m. 2 lo. 54 cars.
A. C. Goodrich, *Supt*. .... Waverly, Ia.
W. S. Couch, *Pur. Agt*........ Dubuque, Ia.
Duck River Valley R. R. 3 g. 34 m.
Geo. Childress, *Supt* .... Columbia, Tenn.
Dunkirk, Allegheny Valley & Pittsburgh R. R.
4-8½ g. 91 m. 14 lo. 102 cars.
D. Thayer, *Gen. Supt*........... Dunkirk, N. Y.
R. C. Moore, *Pur. Agt*..... .New York, N. Y.
J. C. Haggett *M. M. & C. B*..... Dunkirk, N. Y.

E

ast Broad Top R. R. 3 g. 30 m. 6 lo. 191 cars.
A. W. Sims, *Supt* .... Orbisonia, Pa.
A. B. Greenwood, *M. M*...... ...Orbisonia, Pa.
East Tennessee, Virginia & Georgia R. R.
5 g. 1,185 m. 133 lo. 1,597 cars.
Henry Fink, *V. P. & Gen. Man.* Knoxville, Tenn.
J. F. O'Brien, *Gen. Supt*....... Knoxville, Tenn.
W. A. Harrison, *Pur. Agt*. ...Knoxville, Tenn.
East Tenn. Div. and No. Car. and Ohio Branches:
F. K. Huger, *Supt*........... Knoxville, Tenn.
B. J. Sitton, *M. M* ....Knoxville, Tenn.
Jos. Armbruster, *M. C. B*.... Knoxville, Tenn.
Alabama Div.: J. M. Bridges, *Supt*... Selma, Ala.
Simon Gay, *M. M* .. .. Selma, Ala.
W. W. Pierce, *M. C. B*. .... Selma, Ala.
Memphis & Charleston R. R. (Div.):
R. B. Pegram, Jr., *Supt*..... Memphis, Tenn.
H. N. Burford, *M. M*... ......Memphis, Tenn.
Atlanta & Brunswick Divs.:
Atl. Div: Theo. D. Kline, *Supt*.. Atlanta, Ga.
Br Div: J. E. Mallory, *Supt*. .. Macon, Ga.
C. H. Beale, *M. M*........... ... Macon, Ga
M. J. Rogers, *M. M* .... Atlanta, Ga.
East & West R. R. of Alabama.
John Postell, *Manager* .... Cross Plain, Ala.
Eastern R. R. 4-8½ g. 283 m. 99 lo. 2,268 cars.
Payson Tucker, *Gen. Man*........ Boston, Mass.
D. W. Sanborn, *Mast. of Trans*.. Boston, Mass.
G. F. Hurd, *Pur. Agt*............ Boston, Mass.
Amos Pillsbury, *S. M. P. & M*... E. Boston, Mass.
J. D. Billings, *G. For. Car Dept*... Salem, Mass.
Con'y Div.: J. W. Sanborn, *Supt*.. Wolfboro J., N. H.
Eastern Kentucky R. R. 4-8½ g. 34 m. 5 lo. 123 c.
H. W. Bates, *Man. & Pur. Agt*... Riverton, Ky.
D. S. Weaver, *M. M*.......... Riverton, Ky.
Eastern Shore R. R. 4-8½ g. 38 m. 2 lo.
W. Thompson, *Supt*........ Princess Anne, Md.
F. Strattner, *M. M*........ Princess Anne, Md.
Elberton Air-Line R. R. (*See Rich. & Dan. N. G. Brs.*)
Erie & Pittsburg R. R. (*See Penna. Co.*)
Eureka & Palisade R. R. 3 g. 97 m. 7 lo. 124 cars.
B. Gilman, *Gen. Supt & Pur. Agt*. Eureka, Nev.
E. C. Mills, *M. M*.......... ....Palisade, Nev.
A. S. Longley, *M. C. B*....... ...Palisade, Nev.
Evansville, Paducah & Cairo Line. 200 miles
G. J. Grammer, *Supt*........... Evansville, Ind.
Evansville, Rockport & E'n Ry. 4-9 g. 71 m. 5 lo. 98 c
H. L. Shepard, *Supt*............ Evansville, Ind.
Evansv. & Terre Haute. 4-8½ g. 145 m. 26 lo. 900 c.
C. J. Hepburn, *Gen. Supt*...... Evansville, Ind.
John Torrance, *Gen. For* ......Evansville, Ind.

F

Fitchburg R. R., 4-8½ g. 189 m. 100 lo. 3,315 cars.
John Adams, *Gen. Supt*.......... Boston, Mass.
E. K. Turner, *Asst. Supt*.... Fitchburg, Mass.
F. S. Pratt, *Pur. Agt* .... Boston, Mass.
A. Coolidge, *Supt. M. P*........ Boston, Mass.
W. A. Foster, *Asst. Supt. M. P*.. Fitchburg, Mass.
J. W. Marden, *M. C. B* ... Charlestown, Mass.
Flint & Pere Marq. 4-8½ g. 345 m. 68 lo. 1,854 cars.
H. C. Potter, *Gen. Man*..... E. Saginaw, Mich.
D. Edwards, *Asst. Gen. Man*.. E. Saginaw, Mich.
G. G. Cook, *Pur. Agt*......... E. Saginaw, Mich.
Sanford Keeler, *Gen. Supt*.. E. Saginaw, Mich.
W. F. Potter, *Supt.* (E. Div.).. E. Saginaw, Mich.
M. V. Meredith, *Supt.* (W. Div.) E. Saginaw, Mich.
T. J. Hatswell, *M. M*...... .E. Saginaw, Mich.
R. McPherson, *M. C. B* .. ..E. Saginaw, Mich.
Florida Central & Western R. R.
5 g. 234 m. 16 lo. 160 cars.
Wm. M. Davidson, *Gen. Man.* Jacksonville, Fla.
Jas. S. McElroy, *Supt*.. .... Tallahassee, Fla.
Florida Southern Ry. 3 g. 91 m. 6 lo. 96 cars.
J. D. Hollister, *Gen. Supt*.......... Palatka, Fla.
Jas. D. Hollister, *Supt*............ Palatka, Fla.
M. R. Miller, *M. M. & C. B*..... Palatka, Fla.
Florida Transit R. R. 5 g. 224 m.
D. E. Maxwell, *Gen. Supt*..... Fernandina, Fla.
John Hedges, *Pur. Agt*....... Fernandina, Fla.
R. V. Dahoney, *M. M*......... Fernandina, Fla.
G. Hernandez, *M. C. B*..... .Fernandina, Fla.
Fonda, Johnst'n & Gloversv. 4-8½ g. 26 m. 5 lo 18 c.
Lawton Caten, *Supt*.. ......Gloversville, N. Y.
Fond du Lac, Amboy & Peoria. 3 g. 30 m. 2 lo. 35 c.
Alonzo Kinyon, *Supt. & P. A.* Fond du Lac, Wis.
Fort Dodge & Fort Ridley R. R. 4-8½ g.
G. R. Pearson, *Supt*.... ....Fort Dodge, Ia.
Ft. Madison & No.-West'n Ry. 3 g. 41 m. 4 lo. 120 c.
S. B. Kenrick, *Supt. & Pur. Agt.* Ft. Madison, Ia
I. L. Lamb, *M. M. & C. B* .... Ft. Madison, Ia
Ft. Wayne, Cin. & Louisv. 4-8½ g. 108 m. 9 lo. 249 c.
White Water R. R 4-8½ g. 62 m. 5 lo. 170 cars.
W. W. Worthington, *Gen. Supt*... Ft. Wayne, Ind.
T. H. Haberkorn, *M. M*.......... Ft. Wayne, Ind.
Wm. Knight, *M. C. B*.......... Ft. Wayne, Ind.
Fulton County N. G. Ry. 3 g. 61 m. 3 lo. 106 cars.
A. C. Atherton, *Gen. Supt. & P. Agt.* Lewiston, Ill.

G

Galveston, Harrisburg & San Antonio Ry.
4-8½ g. 492 m. 47 lo. 1870 cars.
A. N. Towne, *Gen. Man*.......... Houston, Tex.
E. G. Thompson, *Supt*..... ..Houston, Tex.
El Paso Div.: Jas. Campbell, *Supt*.. El Paso, Tex.
J. L. Bonner, *M. M* .... El Paso, Tex.
San Anto. Div.: W. G. Van Vleck, *Supt*..
San Antono, Tex.
J. J. Ryan, *M. M*............. San Antonio, Tex.
Houston Div.: H. Flanders, *Supt*.. Harrisburg, Tex.
D. T. Davis, *M. M*.............. Harrisburg, Tex.
Louisiana Div.: W. Irwin, *Supt*..... Houston, Tex.
D. C. Smith, *M. M* .... Houston, Tex.
Galveston, Houston & Henderson R. R.
4-8½ g. 50 m. 17 lo. 212 cars.
W. H. Harding, *G. Man. & P. Agt.* Galveston, Tex.
Allen McCoy, *Supt*............ Galveston, Tex.
J. G. Conlon, *M. M*.... ..... . Galveston, Tex.
Geneva, Ithaca & Sayre R. R. (*See Lehigh Val.*)
Georgia R. R. 5 g. 307 m. 42 lo. 938 cars.
John W. Green, *Gen. Man*......... Augusta, Ga.
John S. Cook, *M. M*.............. Augusta, Ga.
T. M. Preval, *M. C. B*... ... .Augusta, Ga.
Georgia Pacific Ry. (Miss. Div.). 3 g. 43 m. 2 lo. 44 c.
G. J. Foreacre, *Supt*.............. Atlanta, Ga.
W. M. Sutton, *Pur. Agt*....... Greenville, Miss.
Benj. Davis, *M. M*... ... .Greenville, Miss.
J. B. Shelton, *M. C. B*. ..... Greenville, Miss.
Grand Haven R. R. (*See Chic. & W. Mich.*)
Grand Junction R'y. (*See Midland of Can.*)
G'd Rap., Newaygo & L. S. R. R. (*See Chic. & W. M.*)
Grand Rapids & Indiana. 4-8½ g. 456 m. 52 lo. 1,566 c.
W. O. Hughart, *Gen. Man.* Grand Rapids, Mich.
W. R. Shelby, *Pur. Agt*.... Grand Rapids, Mich.
S. D. Bradley, *M. M*...... Grand Rapids, Mich.
No'n Div.: J. M. Metheany, *Supt.* G'nd Rap., Mich.
So'n Div.: P. S. O'Rourke, *Supt.* Fort Wayne, Ind.
Grand Tower & Carbondale. 4-8½ g. 25 m. 6 lo. 357 c.
T. M. Williamson, *Supt. & P. A.*. Gr. Tower, Ill.
Hugh Smith, *M. M. & C. B*.... Grand Tower, Ill.
Grand Trunk Ry. 4-8½ g. 2,321 m. 434 lo. 9,403 c.
Joseph Hickson, *Gen. Man*.. ... Montreal, Can.
Wm. Wainright, *Asst. Man* ..... Montreal, Can.
Gr. Tr. Divs.: W. J. Spicer, *Supt.* Montreal, Can.
Jno. Taylor, *Gen. Storekeeper.* Montreal, Can.
Herbert Wallis, *Mech. Supt*... Montreal, Can.
Wm. McWood, *Supt. Car Dept.* Montreal, Can.
F. R. F. Brown, *Man. Lo. Wks* Montreal, Can.
J. Haskoni, *Div. M. S* .. ... Richmond, P. Q.
F. L. Wanklyn, *Div. M. S*. .. Brockville, Ont.
J. Davis Barnett, *Div. M. S*.... Stratford, Ont.
Chi. & Gr. Trunk Ry. 4-8½ g. 330 m. 56 lo. 1,191 c.
S. R. Callaway, *Gen. Man*....... Chicago, Ill.
W. H. Pettibone, *Supt*. .. Battle Creek, Mich.
A. Judd, *Pur. Agt*.......... Fort Gratiot, Mich.
H. Roberts, *Mech. Supt*.... Port Huron, Mich.
Great West'n Div.: 4-8½ g. 823 m. 216 lo. 5,039 c.
Chas. Stiff, *Supt* .... Hamilton, Ont.
E. R. Baines, *Store Kpr*........ London, Ont.
C. K. Domville, *Mech. Supt*... Hamilton, Ont.
C. F. Hanson, *Lo. For*........... London, Ont.
J. D. McIlwain, *Supt. Car Dept*.. London, Ont.
Green Bay, Winona & St Paul R. R.
4-8½ g. 250 m. 19 lo. 599 cars.
Timothy Case, *Gen. Man. & P. A.* Green Bay, Wis.
A. Fenwick, *M. M*........... Ft. Howard, Wis.
Gulf, Col. & Santa Fé Ry. 4-8½ g. 536 m. 43 lo. 1,400 c.
John Sealy, *Gen. Man*........ Galveston, Texas.
F. P. Killeen, *Asst. Gen. Man.* Galveston, Texas.
Jno. W. Thorne, *Pur. Agt*.... Galveston, Texas.
G. B. Nichols, *M. M*....... ...Galveston, Texas.
W. H. Martin, *M. C. B*........ Galveston, Texas.
Gulf, W'n Texas & Pac. Ry. 4-8½ g. 68 m. 6 lo. 70 c.
M. D. Monserrate, *Pr. & Supt*.... Cuero, Texas.
James Mooney, *M. M*....... .....Cuero, Texas.

H

Halifax & Cape Breton Ry. 4-8½ g. 79 m. 9 lo. 268 c.
H. Abbott, *Manager*........ New Glasgow, N. S.
Hannibal & St. Jo. R. R. 4-8½ g. 292 m. 76 lo. 1,860 c.
John B. Carson, *Gen. Man*. .....Hannibal, Mo.
W. R. Woodard, *Supt*..... ......Hannibal, Mo.
T. L. Dunn, *Ch. Eng. & Pur. Agt*.. Hannibal, Mo.
Jas. Long, *Supt. M. P. & Car Dep.* Hannibal, Mo.
Hanover Junction, Hanover & Gettysburg R. R.
4-8½ g. 74 m. 9 lo. 106 cars.
H. D. Scott, *Gen. Supt*...... ......Hanover, Pa.
John J. Bingley *M. M*............ Hanover, Pa.
Henry Britcher, *M. C. B*...... ...Hanover, Pa.
Harrisburg & Potomac R. R. 4-8½ g. 35 m. 3 lo. 34 c.
R. H. Middleton, *Supt*...... Boiling Springs, Pa.
Hartford & Conn. Val. R. R. 4-8½ g. 45 m. 9 lo. 196 c.
Samuel Babcock, *Pr. & Gen. Man.* Hartford, Ct.
Levi Woodhouse, *Asst. Supt*.. , Hartford, Ct.
S. E. Brewer, *M. M. & C. B*..... Hartford, Conn.
Hartford & Conn. W'n R. R. 4-8½ g. 110 m. 16 lo. 495 c.
John F. Jones, *Supt*....... ... .Hartford, Ct.
J. C. Barton, *M. M*............... Hartford, Ct.
Housatonic R. R. 4-8½ g. 126 m. 22 lo. 495 cars.
W. H. Yeomans, *Supt*.. ....Bridgeport, Ct.
D. S. Draper, *Pur. Agt*........ Bridgeport, Ct.
N. Slingland, *M. M*........... Falls Village, Ct.
J. J. Ferris, *M. C. B*....... ...Falls Village, Ct.
Houston Belt Ry 4-8½ and 3 gauge 50 miles.
S. L. Werden, *V. P. & Gen. Man.* Houston, Tex.
Houston, East & West Tex. Ry. 3 g. 120 m. 10 lo. 478 c.
Paul Bremond, *Pr. & Pur. Agt*. Houston, Tex.
E. L. Bremond, *Gen. Man*........ Houston, Tex.
B. O. Diffey, *M. M*............... Houston, Tex.
C. F. Schelewa, *M. C. B*. ......Houston, Texas.
Houston & Tex. Cen. Ry. 4-8½ g. 750 m. 78 lo. 2,526 c.
J. Waldo, *V. Pr. & Gen. Man*... Houston, Tex.
A. H. Swanson, *Gen. Tr. Man*.... Houston, Tex.
E. S. Larchar, *Pur. Agt*........ New York, N. Y.
L. C. Noble, *Gen. M. M*.......... Houston, Tex.
James McGee, *M. C. B*.. ....Houston, Tex.
So. & Wn. Divs.: M. G. Howe, *Supt.* Houston, Tex.
No. & Mi. Divs.: G. A. Quinlan, *Supt.* Dallas, Tex.
C. H. Burns, *Asst. M. M*...... Corsicana, Tex.
No.-Wn. Div: Donald Allen, *Supt*.... Waco, Tex.
Humeston & Shenandoah R. R.
4-8½ g. 85 m. 5 lo. 72 cars.
F. O. Wyatt, *Gen. Man*........... Clarinda, Ia.
M. B. Snyder, *M. M*. .. .. Clarinda, Ia.
Huntingdon & Br. Top Mt. 4-8½ g. 62 m. 18 lo. 69 c.
Geo. F. Gage, *Gen. Supt*. ... .Huntingdon, Pa.
Samuel B. Knight, *Pur. Agt*.. Philadelphia, Pa.
William Barkla, *M. M*...... .....Saxton, Pa.

I

Illinois Central R. R. 4-8½ g. 1,554 m. 224 lo. 6,172 c.
Jas. C. Clark, *Gen. Man*.... ......Chicago, Ill.
E. T. Jeffery *Gen. Supt* ... . .. .Chicago, Ill
C. A. Beck, *Asst. Gen. Supt*........ Chicago, Ill
O. Ott, *Pur. Agt*..... .. .. Chicago, Ill
Henry Schlacks, *S. of Mach*.. ....Chicago, Ill.
W. B. Snow, *M. M. Car Works*..... Chicago, Ill.
Chic. Div.: T. J. Hudson, *Supt* . ... Cairo, Ill.
Wm. Renshaw, *Act. M. M* ...... Chicago, Ill.
Mid. Div.: H. L. Frisbie, *Supt*....... .Pontiac, Ill.
Spring Div.: W. Wilkinson, *Supt.* Springfield, Ill
W. B. McKenna, *M. M*... ....Clinton, Ill.
No'n Div.: J. C. Jacobs, *Supt*.......... Amboy, Ill.
J. B. Edams, *M. M*............. ...Amboy, Ill.
So. Div.: David Oxley, *M. M*...... Centralia, Ill.
Ia. Div.: M. Gilleas, *Supt*....... ... Dubuque, Ia.
Thos. W. Place, *M. M*........ .Waterloo, Ia.
Illinois Midland Ry. 4-8½ g. 176 m. 12 lo. 611 cars.
D. H. Conklin, *Rec. & Gen. Man*...... Decatur, Ill.
O. E. Grady, *Train Mast*........... Decatur, Ill.
Frank Young, *For. Shops*............ Paris, Ill.
Illinois & St. Louis R. R. 4-8½ g. 18 m. 5 lo. 402 c.
Tho. McKissock, *Gen. Man*...... St. Louis, Mo.
C. H. Sharman, *Gen. Supt. & P. A.* St. Louis, Mo.
D. J. Timlin, *M. M*... ....Belleville, Ill.
Charles Rothe, *M. C. B*..... .. E. St. Louis, Ill.
Indiana, Bloomington & Western Ry.
4-8¾ g. 712 m. 64 lo. 3,650 cars.
C. E. Henderson, *Gen. Man*. Indianapolis, Ind.
J. H. Wilson, *Gen. Supt* .....Indianapolis, Ind.
H. C. Norton, *Pur. Agt*...... Indianapolis, Ind.
B. Warren, *Gen. M. M*........ Indianapolis, Ind.
Peoria Div.: I. H. Wilson, *Supt*.. Indianapolis, Ind.
E. Hiserodt, *M. M*.......... .... Urbana, Ill.
St. Louis Div.: I. H. Wilson, *Supt*..... Indnpls, Ind.
John King, *M. M*........... Indianapolis, Ind.
Ohio Div.: D. R. Ennis, *Asst. Supt.* Springfield, Ill.
Jos. S. Porter, *M. M*............ Sandusky, O.
Indiana, Illinois & Iowa R. R. 63 miles.
F. M. Drake, *Gen. Man*..... ... Kankakee, Ill
J. P. Shonts, *Supt*...... ....Kankakee, Ill.
Indiana & Illinois Southern Ry. 3 g. 89 m.
W. C. Lyon, *Gen. Man. & P. Agt.* Robinson, Ill.
J. S. Pickering, *M. M. & C. B*... Effingham, Ill.
Indianapolis & Vincennes R. R. (*See Penna. Co.*)
Intercolonial Ry. 4-8½ g. 846 m. 135 lo. 4,500 cars.
David Pottinger, *Chief Supt*..... Moncton, N. B.
T. V. Cooke, *Gen. Storekeeper*.. Moncton, N. B.
H. A. Whitney, *Mech Supt*...... Moncton, N. B.
Ewd. Shaffer, *M. C. B* .... Moncton, N. B.
Monc. Div.: J. E. Price, *Supt*.. Cambellton, N. B.
Hal. & St. J. Div.: J. J. Wallace, *Supt*.. Truro, N. B.
Levis Div.: A. McDonald, *Supt.* Rivière du Loup, Q.
International Ry. 4-8½ g. 69 m. 2 lo. 12 cars.
D. E. McFee, *Supt* .... Sherbrooke, Que.
International & Gt. N'n R. R. (*See Mo. Pac. Ry.*)
Iron Mountain & Helena R. R. 4-8½ g. 27 m. 2 lo. 11 c
Wm. Bailey, *Pres. & Gen. Man*... Helena, Ark
D. Stillinger, *Supt*................. Helena, Ark
F. M. Green, *Pur. Agt*.... .. .. Helena, Ark
Wm. Summers, *M. C. B*........... Helena, Ark
Ithaca, Auburn & Western Ry. 4-8½ g. 38 m.
Fred T. Peet, *Supt*........... ....Auburn, N. Y.
Ira Dunning, *M. M*. .... Auburn, N. Y.

J

Jacksonville So.-E'n R. R. 4-8½ g. 54 m. 5 lo. 68 c.
E. S. Greenleaf, *Supt*.......... Jacksonville, Ill.
Ira Petrie, *M. M*............... Jacksonville, Ill.
Jacksonv., Pensacola & Mob. (*See Fla. Cent. & W.*)
Jamesville & Washington. 4-8½ g. 22 m. 3 lo. 24 c.
A. Fisher, *Manager*...... .Dymond City, N. C.
J. E. Lordley, *M. M. & C. B*.. Dymond City, N. C.
Jeffersonv'l, Madison & Indpls. R. R. (*See Pa. Co.*)
Jersey City & Albany R. R. 4-8½ g. 38 m.
J. W. McCulloh, *Manager* ...Jersey City, N. J.

K

Kansas Central R. R. (*See Union Pacific.*)
Kansas Cy, Lawrence & So Kan. 4-8½ g. 396 m. 787 c.
C. C. Wheeler, *Gen. Man*..... . Topeka, Kan.
J. L. Barnes, *Supt* .... Lawrence, Kan.
F. M. Smith, *Pur. Agt*. . ... Topeka, Kan.
T. D. Volk, *M. M*..... .... Ottawa, Kan.
Kansas City, Fort Scott & Gulf R. R. 4-8½ g.
Geo. H. Nettleton, *Gen. Man*.. Kansas City, Mo.
L. W. Towne, *Gen. Supt*..... Kansas City, Mo.
H. P. Jacques, *Pur. Agt*.. .. Kansas City, Mo.
J. S. McCrum, *M. M* ....Kansas City, Mo.
A. N. Montier, *M. C. B*......... Kansas City, Mo.
Kansas City, St. Joseph & Council Bluffs; and St. Jo. & Des Moines R. Rs. 4-8½ g. 368 m. 38 lo. 1,148 cars.
J. F. Barnard, *Gen. Supt. & P. A.* St. Joseph, Mo.
Wm. Irving, *Pur. Agt*... .... Chicago, Ill.
F. A. Chase, *M. M*......... ..... St. Joseph, Mo.
Thos. Aylesbury, *G. For. Car. Dep.* St. Joseph, Mo.
Kendall & Eldred R. R. (*See Olean, B. & W.*)
Kent Co.; Sm. & Del. Bay Rds. 4-8½ g. 50 m. 2 lo. 13 c.
Fred Gerker, *Gen. Man*...... Chestertown, Md.
Kentucky Central R. R. 4-9 g. 150 m. 20 lo. 598 cars.
G. W. Bender, *Supt*.. ....Covington, Ky.
A. H. Watts, *F. of Mach*. ......Covington, Ky.
J. L. Hackathorn, *M. C. B*...... Covington, Ky.
Kentucky & South Atlantic Ry. 3 g. 23 m. 3 lo. 52 c
Geo. B. Harper, *Supt. & P. A*.. Mt. Sterling, Ky.
S. P. Hatfield, *M. M*.......... Mt. Sterling, Ky.
Kinzua R. R. (*See Olean, B. & W.*)
Kingston & Pembroke Ry. 4-8½ g. 65 m. 4 lo. 76 c.
B. W. Folger, *Supt*..... .... Kingston, Ont.
C. Gildersleeve, *Pur. Agt*........ Kingston, Ont.
Geo. Becker, *M. M* ... .Kingston, Ont.
Knox & Lincoln R. R. 4-8½ g. 49 m. 5 lo. 95 cars.
C. A. Coombs, *Supt*............ ...... Bath, Me.
Wm. A. Field, *M. M*......... .... Bath, Me.
C. L. Turner, *M. C. B*..... .... Bath, Me.
Knoxville & Augusta R. R. 4-6 g. 16 m. 2 lo. 34 cars.
J. M. Hood, *Supt*... ...... Knoxville, Tenn.
M. R. Hood, *Pur. Agt*.... Knoxville, Tenn.

L

Lake Erie & Western Ry. 4-8½ g. 388 m. 43 lo. 1,526 c.
D. S. Hill, *Gen. Supt*.......... La Fayette, Ind.
T. H. Perry, *Pur. Agt*......... La Fayette, Ind.
H. L. Cooper, *Supt. of Equipment*.... Lima, O.
D. S. Hill, *Gen. Supt*.......... Sandusky, O.
Lake Shore & Michigan So'n Ry.
4-8½ g. 1,243 m. 546 lo. 17,115 cars.
John Newell, *Gen. Man*........... Cleveland, O.
P. P. Wright, *Gen. Supt*..... ....Cleveland, O.
A. C. Armstrong, *Pur. Agt*........ Cleveland, O.
James Sedgley, *Gen. M. M*........ Cleveland, O.
John Kirby, *Gen. M. C. B*......... Cleveland, O.
Buffalo Div.: C. B. Couch, *Supt*..... Cleveland, O.
J. S. Graham, *M. M*......... .. Buffalo, N. Y.
A. C. Robson, *M. C. B*.......... Buffalo, N. Y.
Frank. Div.: G. H. McIntire, *Supt*. Stoneboro, Pa.
Erie Div.: C. B. Couch, *Supt*........ Cleveland, O.
L. O. Gassett, *M. M*... .... Cleveland, O.
J. Withycombe, *M. C. B*.. ..... Cleveland, O.
Toledo Div.: Thos. Flesher, Jr., *Supt.* Cleveland, O.
J. M. Sanborn, *M. M*............. Norwalk, O.
W. O. Smith, *M. C. B*.............. Norwalk, O.
Mich. Div.: J. E. Curtis, *Supt*.......... Toledo, O.
Det. Div.: T. J. Charlesworth, *Supt.* Detroit, Mich.
Lansing Div.: W. H. Caniff, *Supt*.. Lansing, Mich.
Western Div.: A. G. Amsden, *Supt*... Chicago, Ill.
G. W. Stevens, *M. M.* (M. S. Divs.). Elkhart, Ind.
Frank O. Bray, *M. C. B*......... Adrian, Mich.
Ft. Wayne Br; W. H. Caniff, *Supt.* Jackson, Mich.
Kalamazoo Div.:
M. E. Wattles, *Supt*... .....Kalamazoo, Mich.
Lebanon Springs R. R. 4-8½ g.
W. C. Alstyne, *Manager*.. Albany, N. Y.
J. K. Hotaling, *Pur. Agt* ... . Albany, N. Y.
Geo. Tefft, *M. M*............... Chatham, N. Y.
Lehigh Valley R. R. 4-8½ g. 545 m. 321 lo. 33,817 c.
H. S. Goodwin, *Gen. Supt*....... Bethlehem, Pa.
L. Chamberlain, *Pur. Agt*.... Philadelphia, Pa.
John S. Lentz, *M. C. B*....... Packerton, Pa.
N. J. Div.: Jas. Donnelly, *Supt.* Perth Amboy, N. J.
John I. Kinsey, *M. M*............ So. Easton, Pa.
Coal Rds.: J. I. Blakeslee, *Supt.* Mauch Chunk, Pa.
P. Hofecker, *M. M*......... .....Weatherly, Pa.
John Campbell, *M. M*.............. Delano, Pa.
B. M. Div.: A. G. Brodhead, *S*.. Mauch Chunk, Pa.
D. Clark, *M. M*.. ....Hazleton, Pa.
Wy. Div.: A. Mitchell, *S. & M. M.* Wilkesbarre, Pa.
Pa. & N. Y.; and Geneva, Ithaca & Sayre R. Rs.
Wm. Stevenson, *Supt* .... Sayre, Pa.
J. N. Weaver, *M. M*.. .... Sayre, Pa.
Lehigh & Hudson. 4-8½ g. 63 m. 8 lo. 350 cars
Grinnel Burt, *Gen Man*......... Warwick, N. Y.
John Sayre, *Pur. Agt*.. .... Warwick, N. Y
S. Mills, *M. M*..... .... Warwick, N. Y.
Ligonier Valley R. R. 4-9 g. 11 m. 2 lo. 22 cars.
Thos. A. Mellon, *Gen. Manager*.. Pittsburg, Pa.
Geo. Senft, *Supt. & P. Agt*........ Latrobe, Pa.
Little Rock, Miss. River & Texas Ry.
4-8½ g. 160 m. 12 lo. 260 cars.
J. A. Woodson, *G. S. & P. A*. Little Rock, Ark.
F. Hufsmith, *M. M. & C. B*. Arkansas City, Ark.
Little Rock & Fort Smith. 4-8½ g. 168 m. 12 lo. 353 c
T. Hartman, *Gen. Supt*..... ..Little Rock, Ark.
James Eblin, *M. M*...... .... Argenta, Ark
James Malone, *M. C. B*.. .... Argenta, Ark.
Long Island R. R. 4-8½ g. 325 m. 79 lo. 740 cars.
I. D. Barton, *Supt*..... .Long Island City, N. Y.
Benj. Norton, *Pur. Agt*.. Long Island City, N. Y.
C. A. Thompson, *M. M. & C. B*. do.
Louis., Evans. & St. L. Ry. 4-8½ g. 254 m. 24 lo. 1,032 c.
Webster Snyder, *Gen. Man*...... Louisville, Ky
W. H. Field, *Pur. Agt*. .. .. Louisville, Ky.
F. M. Mast, *M. M*......... .. .. Evansville, Ind.
Louisville, New Albany & Chicago Ry.
4-8½ g. 470 miles 56 lo. 3,700 cars.
John McLeod, *Gen. Supt*.... .... Louisville, Ky.
G. C. Breed, *Pur. Agt*...... .. Louisville, Ky.
Josiah Bettis, *M. M. & C. B*... New Albany, Ind.
Nor. Div.: W. G. Sala, *Supt*....... Chicago, Ill.
So. Div.: W. N. Marshall, *Supt.* New Albany, Ind.
Louisville & Nashville R. R.
5 g. 2,090 m. 367 lo. 11,353 cars.
Milton H. Smith, *Gen Man*....... Louisville, Ky.
P. P. Huston, *Pur Agt*........ .Louisville, Ky.
D. W. C. Rowland, *Gen. Supt. Trans.* Louisville, Ky
Reuben Wells, *Supt. Mach*..... Louisville, Ky
Louisv. Divs.; and Louisv., Cin. & Lex. Ry. (Cin. Div.)
J. G. Metcalf, *Supt. Trans*..... Louisville, Ky.
P. Leeds, *M. M.* (Lo. Div.)...... Louisville, Ky.
J. W. Luttrell, *M. M.* (Cin. Div.) Louisville, Ky.
W. P. Pike, *M. M.* (2d & C. Div.). Bowling Green, Ky.
Henderson Div.: L. Hege, *Supt*... Henderson, Ky.
Nash. & D. Div.: J. Geddes, *Supt.* Nashville, Tenn.
W. H. Thomas, *M. M* .... Nashville, Tenn.
S. & N. A. Div.: E. Marsh, *Supt.* Birmingham, Ala.
C. W. White, *M. M*....... Birmingham, Ala.
Mob. & M.; N. Div. Pens. & Sel.; Sl. & Mont. R. Rs.:
M. S. Belknap, *Supt*... . ... Montgomery, Ala.
J. N. Hall, *M. M.* (Mont. Shops). Montgomery, Ala.
N. O. Div.: J. T. Harrihan, *Supt.* New Orleans, La.
Wm. Adair, *M. M*................ Mobile, Ala.
Memp. Div.: W. Colcamp, *Supt.* Memphis, Tenn.
J. V. Slusser, *M. M*............ Memphis, Tenn.
St. L. Div.: Lee Howell, *Supt*..... Evansville, Ind.
Thos. Walsh, *M. M*... .... Mt. Vernon, Ill.
Pensacola and So. Div. Pens. & Selma Rds.:
E. O. Saltmarsh, *Supt*.......... Pensacola, Fla.
R. B. Small, *M. M*.............. Pensacola, Fla.
Louisville & Wadley R. R. 5 g. 10 m.
J. H. Wilkins, *Pr. & Supt*...... Louisville, Ga.

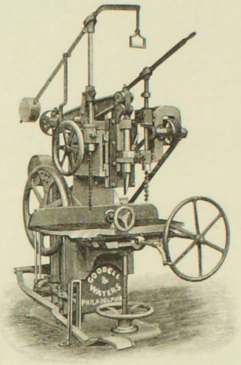
M

Maine Central R. R. 4-8½ g. 470 m. 58 lo. 1,335 c.
Payson Tucker, *Gen. Man*........ Portland, Me.
Ira K. Russell, *M. M*...... ..... Waterville, Me.
C. H. Kenison, *M. C. B*........... Augusta, Me.
Manchester & Keene R. R. (*See B. L. & C.*)
B. F. George, *Asst. Supt*...... ....Keene, N. H.
Manhattan Ry. 4-8½ g. 32 m. 203 lo. 596 pass. c.
Frank K. Hain, *Gen. Man*..... New York, N. Y.
C. L. Green, *Supt*...... .... New York, N. Y
T. W. Peeples, *M. M*...... .... New York, N. Y.
H. A. Webster, *M. C. B* .... New York, N. Y.
Marietta & North Georgia R. R. 3 g. 24 m. 1 lo. 5 c.
J. B. Glover, *Supt & P. Agt*.. ... Marietta, Ga.
E. A. Withers, *M. M*........ ...... Marietta, Ga.
Marquette, Houghton & Ontonagon R. R.
4-8½ g. 100 m. 42 lo. 2,530 cars.
Samuel Schoch, *Gen. Man*..... Marquette, Mich.
M. B. McGee, *Pur. Agt*....... Marquette, Mich.
W. H. Williams, *M. M*........ Marquette, Mich.
H. D. Lyons, *M. C. B*... ...... Marquette, Mich.
Massachusetts Central R. R. 4-8½ g. 48 m.
E. G. Allen, *Supt. & P. A*.......... Boston, Mass.
Memphis & Charleston R. R. (*See E. Tenn. Va. & Ga.*)
Memphis & Lit. Rock R. R. 5 g. 135 m. 14 lo. 272 c.
E. K. Sibley, *G. Man. & P. A*.. Little Rock, Ark.
H. G. Fleming, *Supt*......... .. Memphis, Tenn.
Thos. Rennell, *M. M* .... Argenta, Ark.
P. Twitchell, *M. C. B* .... Argenta, Ark.
Mexican Central Ry.
Howard Hinckley, *Pur. Agt* . . Boston, Mass.
Main Line:
Rudolph Fink, *Gen. Man*..... City of Mexico
J. H. Garner, *Supt. Trans*.... City of Mexico
F. W. Johnson, *M. M*.......... City of Mexico
J. H. O'Brien, *M. C. B*......... City of Mexico
Chihuahua Div.:
D. B. Robinson, *G. Supt.* El Paso del Norte, Mex.
J. N. Lauder, *Supt. R. S.*. El Paso del Norte, Mex.
Tampico Div.:
Edward A. Whorf, *Supt*...... Tampico, Mex.
Mexican National Ry. (*See Tex.-Mex.*)
Michigan Cen. R. R. 4-8½ g. 1,013 m. 266 lo. 8,000 c.
H. B. Ledyard, *Gen. Man*........ Detroit, Mich.
E. C. Brown, *Gen. Supt*.......... Detroit, Mich.
W. P. Taylor, *Gen. Supt*......... Buffalo, N. Y.
Allan Bourn, *Pur. Agt*... .... Detroit, Mich.
S. H. Edgerly, *Gen. M. M*...... Jackson, Mich.
Robert Miller, *Gen. M. C. B*. ... Detroit, Mich.
East. Div.: D. S. Sutherland, *Supt.* Detroit, Mich.
Bay City, Saginaw & Mackinaw Divisions.:
W. A. Vaughan, *Supt*......... Bay City, Mich.
C. E. Smart, *M. M*............ Bay City, Mich.
Main Line: Gr. Rap.; So. Bend; and So. Hav. Divs.:
C. B. Bush, *Supt*... .... Jackson, Mich.
W'n Divs.: R. H. L'Hommedieu, *Supt.* Chicago, Ill.
Middleburg & Schoharie; and
Schoharie Valley R. Rs. 4-8½ g. 10 m. 2 lo. 4 cars
S. S. Danforth, *Gen. Supt*... Middleburg, N. Y.
Midland of Canada. 4-8½ g. 143 m. 12 lo. 503 cars.
Geo. A. Cox, *Gen. Man*..... Peterborough, Ont.
W. B. Ferguson, *Gen. Supt.* Peterborough, Ont.
C. H. Crofts, *Storekeeper*... Peterborough, Ont.
J. Haggas, *Mech. Supt*. .... Port Hope, Ont.
Edward Douglas, *M. C. B*...... Port Hope, Ont.
H. Harry, *M. C. B* .... Lindsay, Ont.
Toronto & Nipissing Div. 3-6 g. 105 m. 12 lo. 211 c.
J. Haggas, *M. M*............ Uxbridge, Ont.
Chas. E. Caron, *M. C. B*....... Uxbridge, Ont.
Midland No. Car. Ry. 5 g. 95 m. 9 lo. 82 cars.
John Gatling, *Gen. Man* .... ..Newbern, N. C.
J. A. Bryan, *Supt* .... Newbern, N. C.
J. W. Andrews, *Supt*........... Goldsboro, N. C.
B. Manly, *Supt. of Mach*........ Newbern, N. C.
Milwaukee, Lake Shore & Western Ry.
4-8½ g. 322 m. 40 lo. 1,536 cars.
H. G. H. Reed, *Gen. Man. & P. Agt.* Milwaukee, Wis.
J. Donahue, *Supt* .... Milwaukee, Wis.
Chas. S. Hayden, *Asst. Supt*... Manitowoc, Wis.
David B. Curtis, *Asst. Supt*.. Oshkosh, Wis.
John Hickey, *M. M* ... . Manitowoc, Wis.
Milwaukee & Northern.
C. F. Dutton, *Gen. Supt*....... Milwaukee, Wis.
N. S. Kimball, *M. M*............ Green Bay, Wis.
Mineral Range R. R. 3 g. 13 m. 4 lo. 42 cars
Chas. E. Holland, *Pr. & Supt*... Hancock, Mich.
W. H. Carr, *Pur. Agt*... ...... Hancock, Mich.
T. J. Shellhorn, *M. M. & C. B*. Hancock, Mich.
Minneapolis & St. L. Ry. 4-8½ g. 506 m. 60 lo. 1,850 c.
W. H. Truesdale, *Supt*. .... Minneapolis, Minn.
Geo. F. Wilson, *Supt. of M.* Minneapolis, Minn.
Mississippi & Tenn. R. R. 4-8½ g. 101 m. 11 lo. 194 c.
M. Burke, *Gen. Supt*... ....Memphis, Tenn.

Goodell & Waters

PHILADELPHIA, PA.

WOOD-WORKING MACHINERY



HEAVY CAR MORTISER.

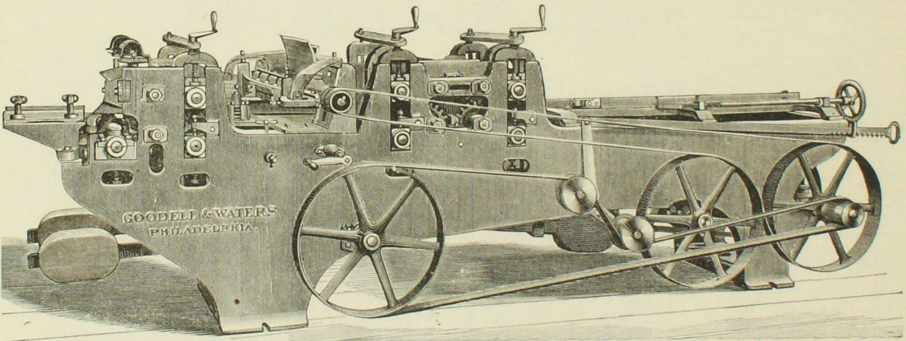
FOR

RAPID PLANING AND MATCHING,
CAR WORK,
EXACT AND SMOOTH
FINISHING,
MORTISING,
BORING, ETC.

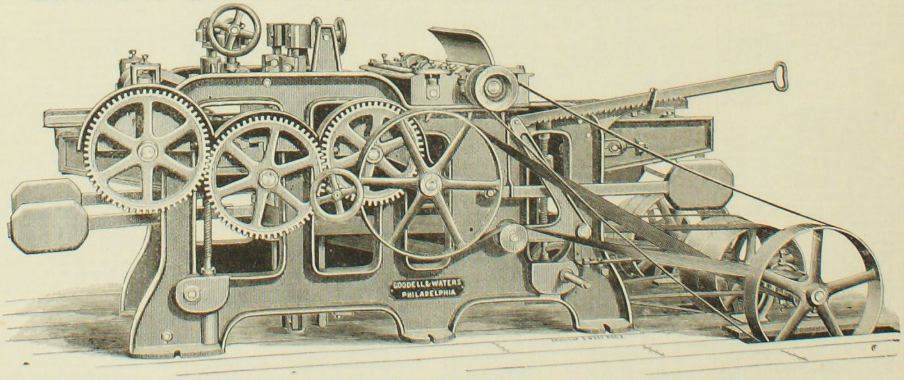
OUR **KEYSTONE** FLOORING MACHINE has now an established reputation as a special machine for rapid and good work.

We have confidential statistics and facts of great practical value to customers who are about to purchase.

In this machine we have retained the most desirable adjustments of the Woodworth Machine, and especially of the Woodbury Pressure Bar; we apply these bars and adjustments to both bottom and topheads and they will be found to be new in design, SELF-ACTING AND RELIABLE.



KEYSTONE FLOORING MACHINE.



CAR SILL PLANER AND DOUBLE-SURFACER AND JOINTER.

OUR ASSORTMENT OF GENERAL MACHINERY is larger than ever and continually increasing in variety. It now embraces first-class machines for bandsawing, slitting and cut-off sawing, resawing and scroll sawing, jointing, grooving, molding, tenoning, turning, mortising, shaping, etc. with requisite shafting, pulleys, hangers, arbors, knives, cutters, chisels, and fixtures for railway and street car builders, ship joiners, makers of heavy and light agricultural implements, pianos, organs, clock cases, furniture, boxes, toys, modern wainscot and hard wood finish.

Our new Catalogue is now ready, and we propose to give it a liberal distribution among mill men, foremen and workmen. Send us your personal address if you wish a copy.

GOODELL & WATERS,

31st and Chestnut Streets, - - - - - - Philadelphia, Pa.

J. C. Ramsey, *M. M*.... ....Memphis, Tenn.
S. J. Bolton, *M. C. B*............Memphis, Tenn.
Missouri Pacific Ry. (Leased and operated lines.)
4-8½ g. 5,879 m. 682 lo. 19,648 cars.
A. A. Talmage, *Gen. Man*........St. Louis, Mo.
R. B. Lyle, *Pur. Agt*.............St. Louis, Mo.
(1)Missouri Pac.Ry. 4-8½ g.2,708 m.324 lo.10,000 c
John Hewitt, *Supt. Mach*.........St. Louis, Mo.
John Hodge, *Supt. Car Dep*.......St. Louis, Mo.
Main Line, Warder Cumming, *Supt*..Sedalia, Mo.
W. W. Fagan, *Supt*..W'n Div.,Atchison, Kan.
Le Roy Bartlett, *Asst. M. M*....St. Louis, Mo
Geo. Walshe, *M. M*.. ..Sedalia, Mo
M., K. & Tex. Div., *Supt*.Sedalia, Mo.
J. C. Barber, *Asst. Supt. Car Dep*.Sedalia, Mo.
J. W. Haines, *M. M* .. ..Parsons, Kan
Cen. Br. Div., W. W. Fagan, *Supt*.Atchison, Kan.
H. V. Faries, *M. M*..... ....Atchison, Kan.
S. Irvin, *Asst. Supt. Car Dep*. .Atchison, Kan.
(1) St. L., I. M. & So. 4-8½ g. 859 m. 141 lo. 4,860 c.
Wm. Kerrigan, *Supt* .. ..Louis, Mo.
O. A. Haynes, *S. M. P. & M*.. ....De Soto, Mo.
St. Louis Div.: W. H. Harris, *M. M*..De Soto, Mo.
Ark.Div.: R.M.Richardson,*M.M.*Little Rock,Ark.
H. H. Sessions, *M. C. B* .....Marshall, Tex.
(2) Texas & Pac. 4-8½ g. 1,487 m. 144 lo. 3,076 c.
J. M. Eddy, *Supt*.... ... .Dallas, Tex.
O. A. Haynes, *S. M. P. & M*......Marshall, Tex.
New Or. Div.: J. T. Whedon, *Supt*.Gouldsboro,La.
Perry Stevens, *M. M*.............Marshall, Tex.
Eastern Div.: J. Williams, *Supt*. .Longview, Tex.
Rio Gr. Div.: G. O. Clinton, *Supt*.Big Springs,Tex.
Wm. Foley, *M.M*..... ....Big Springs, Tex.
(3) Int. & G. North. 4-8½ g. 776 m. 73 lo. 1,712 c.
Jos. Harrin, *Supt*.............. .. Palestine, Tex.
O. A. Haynes, *S. M. P. & M*....Palestine, Tex.
O. H. Johnson, *M. M* ....Palestine, Tex.
Mobile & Ala. Grand Trunk R. R. 5 g. 59 m. 2 lo. 23 c.
Wm. H. Pratt, *Trustee*..............Mobile, Ala.
Mobile & Girard R. R. 5 g. 84 m. 7 lo. 112 cars.
W. L. Clark, *Gen. Supt*.........Columbus, Ga.
J. C. Albrecht, *M. M*.... ....Columbus, Ga.
A. J. Nix, *M. C. B*...............Columbus, Ga.
Mobile & Ohio R. R. 5 g. 528 m. 75 lo. 1,353 cars.
G. Jordan, *V.-Pr. & Gen. Man*.....Mobile, Ala.
F. Jordan, *Pur. Agt*. ....Mobile, Ala.
R. H. Briggs, *Gen. M. M*.. ....Whistler, Ala.
J. T. Booth, *M. C. B*......... ....Whistler, Ala.
So'n Div., I. G. Motley, *Supt*... ....Mobile, Ala.
John Fitzgerald, *M. M*.... ......Macon, Miss.
No'n Div.: E. S. Horsford, *Supt*. Jackson, Tenn.
M. T. Carson, *M. M*...........Jackson, Tenn.
Mobile & Spring Hill R. R. 5 g. 8 m. 10 lo. 90 cars.
F. Ingate, *Supt*....... ....Mobile, Ala.
Mont Alto R. R. 4-9 g. 21 m. 2 lo. 3 cars.
G. B. Weistling, *Supt. & P. A*....Mont Alto, Pa.
Montpelier & Wells Riv. R. R. 4-8½ g. 38 m. 3 lo. 76c.
W. A. Stowell, *Supt*... ....Montpelier, Vt.
Morgan's Louisiana & Tex. R. R. 4-8½ g. 165 m.
Supt.......New Orleans, La.
C. Trumpy, *Pur. Agt*. .... . New Orleans, La.
N. Tilton, *M. M*............ .. ..Algiers, La.
Wm. O'Brien, *M. C. B*....... ..... Algiers, La.
Muncy Creek Ry. 4-8½ g. 10 m.
Benj. G. Welch, *Rec. & P. Agt*.Hughesville, Pa.
J. V. Chamberlain, *Supt. & M. M*. do.

N

Nashville, Chattanooga & St. Louis R'y.,
5 g. 508 miles 87 lo. 1,979 cars.
J. W. Thomas, *G.Supt.&P.Agt*.Nashville, Tenn.
M. J. C. Wrenne, *Supt*.. . ...Nashville, Tenn.
James Cullen, *M. M. & C.B*...Nashville, Tenn.
Natchez, Jackson & Col. R. R. 3-6 g. 98 m. 7 lo. 72 c.
E. G. Frost, *Gen. Supt*..... ... Natchez, Miss.
Naugatuck R. R., 4-8½ g. 61 miles, 14 lo. 384 cars.
Geo. W. Beach, *Supt*.... . .....Waterbury, Ct.
Henry Hanford, *M. M*......... .Bridgeport, Ct.
Geo. W. Gray, *M. C. B*. ....Bridgeport, Ct.
Nevada Central R. R. (*See Union Pac.*)
Nevada County N. G. R. R. 3 g. 23 m. 3 lo. 46 cars.
John F. Kidder, *Supt*.... ....Grass Valley, Cal.
Jas. McCormick, *M. M. & C. B*.Grass Valley,Cal.
New Brunswick Ry. 4-8½ g. 194 m. 12 lo. 266 cars.
E. R. Burpee, *Gen. Man*.. ....Gibson, N. B.
Henry Osborn, *Gen. Supt*.........Gibson, N. B.
Alfred Seely, *Pur. Agt*.... .. ....Gibson, N. B.
Jesse Mathews, *M. M*.............Gibson, N. B.
T. N. Burpee, *M. C. B*............Gibson, N. B.
New Brunswick & Can. Ry. 4-8½ g. 127 m. 12 lo. 184c.
Henry Osborn, *G. M. & P. A*. St. Andrew's, N. B.
John Stewart, *Supt*...... ....St. Stephen, N. B.
Thos. Armstrong, *M. M*.... St. Andrew's, N. B.
G. Houlton, *M. C. B*.......St. Andrew's, N. B.
New Haven & Derby R. R. 4-8½ g. 13 m. 3 lo. 58 c.
E. S. Quintard, *Supt*. .. ....New Haven, Conn.
J. M. Whitlock, *M. M. & C. B*.New Haven,Conn.
New Haven & No'mpton. 4-8½ g. 135 m. 26 lo. 572 c.
Supt. .... New Haven, Ct.
C. N. Yeamans, *Pur. Agt* ......New Haven, Ct.
Henry Fox, *M. M*........ ......New Haven, Ct.
John Sweeny, *M. C. B*..........New Haven, Ct.
New Jersey & New York Ry. 4-6 g. 43 m. 6 lo. 40 c.
J. D. Hasbrouck, *Gen. Man* Jersey City, N. J.
J. S. Drake, *Supt. & M. M*... ...Hillsdale, N. J.
L. B. Van Wagonen, *M. C. B* ....Hillsdale, N. J.
New Jersey Southern Ry. (*See Central, N. J.*)
New London Northern R. R (*See Central Ver.*)
New Orleans Pacific Ry. 5 g. 85 m. 10 lo. 206 cars
H. S. Morse, *Supt*.... ....New Orleans, La.
E. R. Smith, *M. M. & C. B*....New Orleans, La.
N. Y. Central & Hudson River R.R.
4-8½ g. 962 m. 676 lo. 22 539 cars.
J. M. Toucey, *Gen. Supt*...... New York, N. Y.
R. C. Moore, *Pur. Agt*........ New York, N. Y.
Wm. Buchanan, *Supt. M. P*... New York, N. Y.
L. Garey, *Supt. Car Dept*.. .. New York, N. Y.
N. Y. & Har. Div.: C. M. Bissell, *Supt*. do.
P. McQ. Gibson, *M. M* .... .New York, N. Y.
C. E. Garey, *M. C. B*........Morrisania, N. Y.
Hud. Riv. Div.: C. M. Bissell, *Supt*.N. York, N. Y.
Peter Smith, *M. C. B*... ....New York, N. Y.
E'n Div.: Zenas C. Priest, *Supt* ... ..Utica, N. Y.
John Ortton, *M. M*........West Albany, N. Y.
D. Hoit, *M. C. B*......... West Albany, N. Y.
W'n Div.: Geo. H. Burrows, *Supt*.Rochester, N. Y.
S. L. White, *M. M*...........Syracuse, N. Y.
Amos Gould, *M.M*...... .E. Buffalo, N. Y.
E. A. Olmstead, *M. C. B*....E. Buffalo, N. Y.
C. H. Burchard, *M. C. B*..E. Rochester, N. Y.
Rd. Donaby, *M. C. B*....Niagara Falls, N. Y.
N. Y. Chic. & St.L. Ry. 4-8½ g. 209 m. 115 lo.4,838 c
Lewis Williams, *Gen. Man*..... . Cleveland, O
Gen. Supt.......Cleveland, O.
Jno. W. Dougherty, *Pur. Agt*.....Cleveland, O.
Jno. Mackenzie, *Supt. M. P*. .....Cleveland, O.
Eas'tn Div.: G. H. Kimball, *Supt*.. .Cleveland, O.
E. A. Miller, *M. M*.............Conneaut, O.
West'n Div.: A. H. Evans, *Act. Supt*..Chicago, Ill.
Jas. Eckford, *M. M* .. ..Bellevue, O.
New York City & Northern. 4-8½ g. 54 m. 9 lo. 368 c
Frank S. Gannon, *Gen. Supt*.High Bridge, N. Y.
Theo. Wheeler, *M. M*........High Bridge, N. Y.
New York, Lake Erie & Western R. R.
4-8½ g. 1,020 m. 568 loco. 30,500 cars.
Robt. Harris, *V. Pr. & G. Man*.New York, N.Y.
E. S. Bowen, *Gen. Supt*........New York, N. Y.
J. A. Hardenburg, *Pur. Agt*..New York, N. Y.
F. M. Wilder, *Supt. M. P. & M*...Susqueh'a, Pa.
E'n Div.: E. O. Hill, *Supt*......Jersey City, N. J.
J. H. Vreeland, *M. M*.......Jersey City, N. J.
J. N. Mileham, *M. C. B*.....Jersey City, N. J.
Del. Div.: W. J. Murphy, *Supt*..Port Jervis, N. Y.
J. Van Vechten, *M. M. & C. B*.Pt. Jervis, N. Y.
Susq. Div.: I. Jolls, *Supt*...... .....Elmira, N. Y.
V. Blackburn, *M. M*.... ...Susquehanna, Pa.
D. B. Goodell, *M. C. B*... ....Elmira, N. Y.
Buf. & R. Divs.: Chas. Neilson, *Supt.;* and
G. B. Ross, *M. M*...............Buffalo, N. Y.
M. Wilder, *M. C. B*.............Buffalo, N. Y.
B. & S.-W. Div.: C. A. Brunn, *Supt* do.
W'n Div.: W. B. Coffin, *Supt*..Hornellsville, N Y
Geo. H. Griggs, *M. M*... .Hornellsville, N. Y
New York, New Haven & Hartford R. R.
4-8½ g. 203 m. 123 lo. 2,768 cars.
E. M. Reed, *V. P. & Gen. Man*..New Haven, Ct.
R. N. Dowd, *Pur. Agt* ....New Haven, Ct.
N. Y. & N. H. Div.: W.H. Stevenson, *Supt*...N. Y.
Shore Line Div.:
O. M. Shepard, *Supt*......... N. Haven, Ct.
Air Line Div.: O. M. Shepard *Supt*.N. Haven, Ct.
H. Kettendorf, *Supt. M. P*...New Haven, Ct.
Jas. Denver, *M. C. B*.........New Haven, Ct.
Hart. Div.: C. S. Davidson, *Supt*....Hartford, Ct.
John Henny, Jr., *Supt. M.P. & M. C. B*.... do.
New York, Ontario & Western Ry.
4-8½ g. 249 m. 79 lo. 1,539 cars.
Gen. Supt.. .. New York, N. Y.
I. W. Fowler, *Pur. Agt*......Middletown, N. Y.
Edw. Minshull, *M. M. & C. B*.Middletown, N. Y.
Mid. Div.: N. R. Hankins, *Supt*.Middletown, N. Y.
No'n Div.: C. W. Lanpher, *Supt*....Norwich, N. Y.
So. Div.: E. Canfield, *Supt*........Tappan, N. Y.
New York, Pennsylvania & Ohio R. R.
4-8½ g. 564 m. 218 lo. 7,394 cars.
J. M. Ferris, *Gen. Man*........Cleveland, Ohio
J. H. Holway, *Pur. Agt*.... ..Cleveland, Ohio.
Wm. Fuller, *Gen. M. M. & C. B*...Cleveland, O.
S. V. Smith, *Asst. Gen. M. C. B*. ...Kent, Ohio.
E'n Div.: A. L. Dunbar, *Supt*.......Meadville, Pa.
J. A. Cooper, *M. M*... ....Meadville, Pa.
D. S. Dockstader, *M. C. Rep*...Meadville, Pa.
J. T. Fosdick, *For. Car Rep*.Salamanca, N. Y.
W'n Div.: J. W. Alsop, *Supt*... ...... Galion, O.
Wm Hill, *M. M*... .. ..Galion, O.
J. W. Holmes, *For. Car Rep*. ......Galion, O.
Geo. Wilson, *For. Car Rep*.... Dayton, Ohio.
Maho'g Div.: N. F. Wood, *Supt*. .... .Cleveland, O.
N. Wright, *M. M*...............Cleveland, O.
C. N. Thorp, *M. C. Rep* ....Cleveland, O.
New York, Providence & Boston R. R.
4-8½ g. 72 m. 29 lo. 430 cars.
J. B. Gardner, *Supt*.............Providence, R. I.
Giles F. Ward, *Pur. Agt*......Stonington, Conn.
J. H. Anderson, *M. M. & C. B*.Providence, R. I.
N. Y., Susquehanna & W'n. 4-9 g. 135 m. 28 lo. 925 c.
F. A. Potts, *Gen. Man*.........New York, N. Y.
C. D. McKelvey, *Asst. Supt*. Jersey City, N. J.
C. T. Demarest, *Pur. Agt*.....New York, N. Y.
W. C. Ennis, *M. M. & C. B*...Wortendyke, N. J.
New York, West Shore & Buffalo Ry.
Chas. Paine, *Gen. Man*. ......New York, N. Y.
R. H. Soule, *Supt. M. P*.......New York, N. Y.
P. S. Bemis. *Pur. Agt*........New York, N. Y.
Harry Linn, *M. M*.
Walkill Ry. G. H. Graves, *Supt*..Rondout, N. Y.
New York, Woodhaven & Rockaway R. R.
4-8½ g. 26 m. 8 lo. 101 cars.
J. M. Lunt, *Supt. & P. Agt*..Hunter's Pt., L. I.
W. B. Turner, *M. M*........Hunter's Point, L. I.
N. Y. & Greenwood Lake Ry. 4-8½ g. 44 m. 8 lo. 53 c.
Stephen Smith, *Supt*..........Jersey City, N. J.
J. A. Hardenburg, *Pur. Agt*...New York, N. Y.
G. A. Hill, *M. M*..... . ...Pompton, N. J.
N. Y. & Manhattan Beach Ry. 3 g. 23 m. 12 lo. 128 c.
D. C. Corbin, *Man. Dir*.... ...New York, N. Y.
O. Fairhurst *M. M*...... ....Greenpoint, L. I.
New York & New England R. R.
4-8½ g. 463 m. 127 lo. 3,326 cars.
S. M. Felton, Jr., *Gen. Man*......Boston, Mass.
W. W. McKim, *Pur. Agt* ....Boston, Mass.
Ross Kells, *Supt. M. P*............Boston, Mass.
A. K. Mansfield, *Mech. Eng*. ....Boston, Mass.
W. G. Tabor, *M. M* ....Boston, Mass.
H. E. Barker, *Gen. Fore*........Norwood, Mass.
East Div: C. C. F. Bent, *Supt*......Boston, Mass.
Nor. Div.: P. St. M. Andrews, *Supt*...Norwich, Ct.
W. A. Stone, *M. M* ....Norwich, Ct.
Prov. Div.: L. W. Palmer, *Supt*..Providence, R. I.
Hfd. Div.: E. Holbrook, *Supt*.......Hartford, Ct.
E. M. Humstone, *M. M*. ....Hartford, Ct.
D. F. Andregg, *For. C. Dept*.. ..Hartford, Ct.
Newburg, Dutchess & Conn. R. R. 4-8½ g. 58 miles.
C. L. Kimball, *Gen. Supt*.....Matteawan, N. Y.
W. G. Van Buskirk, *M. M. & C. B.*,
Dutchess Junction, N. Y.
Norfolk Southern. R. R. 4-8½ g. 79 m. 6 lo. 158 c.
M. K. King, *Gen. Man. & Pur. Agt*.Norfolk, Va.
J. S. Whitworth, *M. M. & C. B* ....Norfolk, Va.
Norfolk & Western R. R. 5 g. 428 m. 82 lo. 1,220 c.
J. H. Sands, *Gen. Supt*....... .Lynchburg, Va.
W. C. De Armond, *Pur. Agt*...Philadelphia, Pa.
C. Blackwell, *Supt. M. P*..... ....Roanoke, Va.
West'n Div.: Frank Huger, *Supt*...Lynchburg, Va.
F. Sterk, *M. M*...............Lynchburg, Va.
East'n Div.: N. M. Osborne, *Supt*...Petersburg, Va.
J. T. Robinett, *M. M. & C. B*...Petersburg, Va.
North-Eastern R. R. of Ga. 5 g. 40 m. 2 lo. 18 cars.
H. R. Bernard, *Supt*...............Athens, Ga.
North-Eastern R. R. (S. C.) (*See Wil. & Wel.*
North Pacific Coast R. R. 3 g. 84 m. 12 lo. 320 cars.
David Nye, *Gen. Supt*..........San Rafael, Cal.
W. F. Russell, *Pur. Agt* ....San Francisco, Cal.
J. Fowler, *M. M*.... ....Sancelito Cal.
North Shore.
A. Davis, *Gen. Man*...............Quebec, Can.
Northern (N. H.), and Concord & Claremont Rys.
4-8½ g. 173 m. 25 lo. 569 cars.
Geo. E. Todd, *Supt*..............Concord, N. H.
M. M. & C. B. & Pur. Agt.. do.
Northern (N. J.) R. R. (*See N. Y., L. E. & W'n.*)
Northern Central Ry. (*See Penna. (R.R.)*
North'n Pacific R. R. 4-8½ g.1,193 m. 104 lo. 3,089 c.
Herman Haupt, *Gen. Man*..... St. Paul, Minn.
John H. Ames, *Pur. Agt* ....St. Paul, Minn.
J. T. Odell, *Supt. Trans* ....St. Paul Minn.
Geo. W. Cushing, *Supt. M. P., M. & R. S*. do.
St. P. & Minn. Divs.: M. C. Kimberly, *Supt*., do.
H. J. Small, *A. S. Mach*......Brainerd, Minn.
Frank Howard, *M. C. B*......Brainerd, Minn.
Dakota Div.: J. M. Graham, *Supt*.. .Fargo, Dak.
A. Rupert, *M. M*.. ....Fargo, Dak.
Mo. Div.: D. R. Taylor, *Supt*...... Mandan, Dak.
E. F. Doran, *M. M*..............Mandan, Dak.
Yell'st'e Div.: S. R. Ainslie, *Supt*.Glendive, Mont.
S. L. Bean, *M. M* ....Glendive, Mont.
G. S. La Rue, *M. M*.. ....Billings, Mont.
(2) Western Div.: J. M. Buckley, *A. G. M.;* and
Otis Sprague, *Supt*.......New Tacoma, W. T.
H. D. Sanborn, *Pur. Agt*......Portland, Ore.
W. T. Small, *A. S. Mach*. (W.D.)Sprague, W. T.
Robt. Walker, *M. C. B*........Sprague, W.T.
F. C. Ford, *M. M*....... ...New Tacoma, W. T.
S. Wishart, *M. C. B*......New Tacoma, W. T.
Pend d'Ore Div.:
F. F. Griffin, *Supt*,..........Ainsworth, W. T.
J. Evans, *M. M*........... ...Sprague, W. T.
Northern & North-W'n Ry. 5-6 & 4-8½ g. 50 lo. 1,033 c.
James Webster, *Supt*.......... ....Toronto, Can.
W. C. Schreeber, *Pur. Agt*........Toronto, Can.
P. Clarke, *M. M*... .... .Toronto, Can.

O

Ogdensburg & Lake Champlain R. R.
4-8½ g. 122 m. 33 lo. 1,160 cars.
A. A. Gaddis, *Gen. Man*......Ogdensburg, N. Y.
Abr. Klohs, *Supt. & M. M*........Malone, N. Y.
J. N. Brown, *M. C. B*.............Malone, N. Y.
Ohio Central R. R. 4-8½ g. 230 m. 45 lo. 4,760 cars.
John E. Martin, *Gen. Man* . .. Toledo, O.
T. M. Peeler, *Supt* .... .Bucyrus, O.
F. W. Stewart, *Pur. Agt* .. ..Toledo, O.
J. B. Morgan, *M. M. & C. B*........Bucyrus, O.
Ohio Southern. 4-8½ g. 119 m. 19 lo. 623 cars.
D. R. Ennis, *Supt*................Springfield, O.
H. C. Norton, *Pur. Agt*......Indianapolis, Ind.
W. B. Warren, *M. M*.............Springfield, O.
Ohio & Mississippi Ry. 4-9 g. 615 m. 112 lo. 2,501 cars.
W. W. Peabody, *Gen. Man*.......Cincinnati, O.
G. E. Atwood, *Pur. Agt*..........Cincinnati, O.
J. H. Setchel, *Gen. M. M*.... .....Cincinnati, O.
Cin. Div.: C. B. Cole, *Supt*..... ....Seymour, Ind.
John Thumser, *M. M*..... .....Seymour, Ind.
J. P. Coulter, *M. C. B*.. ....Aurora, Ind.
Arthur Donaldson, *M. M*......Vincennes, Ind.
St. L. & Sp. Div.: C. M. Stanton, *Supt*.St. Louis, Mo.
J. W. Stokes, *M. M*. (Spring. Div.)..Pana, Ill.
Louisv. Div.: C. B. Cole, *Supt* . .Louisville, Ky.
Oil City & Chicago R. R. 4-9 g. 36 m. 6 lo. 50 cars.
A. Vandiwort, *Supt*.......... .New Castle, Pa.
Oil City & Ridgway R. R. 4-8½ g. 6 m. 1 lo. 43 cars.
A. F. Kent, *Gen. Man*..... ....Oil City, Pa.
Old Colony R. R. 4-8½ g. 463 m. 110 lo. 2,862 cars.
J. R. Kendrick, *Gen. Man*.......Boston, Mass.
Main Li. Div.: J. H. French, *Supt*...Boston, Mass.
R. W. Husted, *Pur. Agt*...........Boston, Mass.
J. K. Taylor, *M. M* ....Boston, Mass.
M. C. B.................Boston, Mass.
Cape Cod Div.: C. H. Nye, *Supt*..Hyannis, Mass.
No. Div.: S. A. Webber, *Supt*....Fitchburg, Mass.
George W. Reynolds, *M. M*......Taunton, Mass.
Sam. Stevens, *M. C. B*... ..... Taunton, Mass.
Olean, Bradford & Warren; Bradford; Kinzua; and
Kendall & Eldred R. Rs. 3 g. 38 m. 9 lo. 222 cars.
J. W. Watson, *Gen. Supt*.... ......Olean, N. Y.
J. H. Poole, *Pur. Agt* ....Buffalo, N. Y.
Charles Turner, *M. M. & C. B*.. ..Olean, N. Y.
Oregon Ry.& Nav.Co. 4 8-½ g. 225 m. 31 lo. 930 cars.
C. H. Prescott, *Manager*.........Portland, Ore.
R. E. O'Brien, *Asst. Man. & Act. Supt*. do.
K Von Oterendorf, *Supt*. (O.Div.) S.F'cisco,Cal.
H. S. Rowe, *Supt*. (Ry Div.)......Portland, Ore.
J. M. Drake, *Pur. Agt*.......... Portland, Ore.
C. C. Hobart, *Gen. M. M*.. ....The Dalles, Ore.
Chas. A. Phipps, *M. C. B*..... The Dalles, Ore.
N. G. Div.: Wm. Reed, *Man*.... . Portland, Ore.
James Walch, *M. M*.............Portland, Ore.
Oregon & California R. R. 4-8½ g. 200 m. 14 lo. 286 c.
R. Koehler, *Act. Man*............Portland, Ore.
J. Brandt, *Gen. Supt*............Portland, Ore.
A. Brandt, *M. M*.... ....Portland, Ore.
Owensboro & Nashville R. R. 5 g. 44 m. 3 lo. 70 c.
R. S. Bevier, *Act. Supt* .. ..Owensboro, Ky.
H. M. Gabel, *M. M. & C. B*....Owensboro, Ky.

P

Pacific Coast Ry. 3 g. 11 m.
J. M. Fillmore, *Manager*.San Luis Obispo, Cal.
W. H. Masterman, *M. M. & C. B*. do.
Painesville & Youngstown R. R. 3 g. 65 m. 7 lo. 319 c.
R. K. Paige, *Rec. & Man*.........Painesville, O.
J. A. Newcome, *Supt*............ Painesville, O.
E. B. Baldwin, *M. M*............ Painesville O.
Panama R. R. 5 g. 58 m. 14 lo. 534 cars.
H. A. Woods, *Supt*........ Aspinwall, U. S. Col.
E. Z. Penfield, *Pur. Agt*.......New York, N. Y.
D. P. Wright, *M. M*........Aspinwall, U. S. Col.
Parker & Karns City; and
Karns City & Butler R. Rs. 3 g. 27 m. 5 lo. 84 cars.
W. C. Moberly *Gen. Supt*...... Parker City, Pa.
Philip Davies, *M. M*............Parker City, Pa.
Wm. Wolford, *M. C. B*.........Parker City, Pa.
Passumpsic R. R. 4-8½ g. 145 m. 28 lo. 980 cars.
E. Raymond, *Pres. & Pur. Agt*..Boston, Mass.
H. E. Folsom, *Supt*............Lyndonville, Vt.
L. L. Brigham, *M. M*........ . Lyndonville, Vt.
L. F. Woodard, *M. C. B* . ....Lyndonville, Vt.
Peach Bottom R. R. 3 g. 55 m. 6 lo. 52 cars.
Samuel Dickey, *Gen. Man*...........York, Pa.
G. R. Dickey, *Supt. & Pur. Agt*......York, Pa.
E. H. Williams, *M. C. B*...............York, Pa.
E. Div.: S. Dickey, *Supt*.. ... .Oxford, Pa.
W. P. Kirk, *M. M*.................Oxford, Pa.
Pennsylvania Co.'s (9) Roads.
4-9 g. 2,838 m. 817 lo. 29,432 cars.
Wm. Mullins, *Gen. Pur. Agt*......Pittsburg, Pa.
Joseph Wood, *Supt. M. P*.... .Fort Wayne, Ind.
(1) Clev. & Pittsb'g R. R. 4-9 g. 224 m. 97 lo. 3,336 c.
R. F. Smith, *Asst. Man*..........Cleveland, O.
Philip Bruner, *Supt*.............Wellsville, O.
W. F. Beardsley, *Mast. of Mach*. Wellsville, O.
(2 & 3) Erie & Ashtabula Rds. 178 m. 29 lo. 1,340 c.
John M. Kimball, *Supt*.......Youngstown, O.
J. A. Wood, *Gen. For. Shops*........Erie, Pa.
(4) Indianap. & Vincennes Rd. 117 m. 11 lo. 303 cars.
Jas. J. Turner, *Supt*.......Indianapolis, Ind.
(5) Jeffersonville, Madison & Indianapolis R. R.
4-9 g. 217 m. 47 lo. 784 cars.
E. W. McKenna, *Supt*..........Louisville, Ky.
Wm. Swanston, *M. M*.....Jeffersonville, Ind.
Edw. Austin, *M. C. B* .. ..Jeffersonville. Ind.
(6) Northwestern Ohio Ry. 4-9 g. 79 m.
J. S. Morris, *Supt*........ .. ..Toledo, O.
(7) Pittsburg, Ft. Wayne & Chicago Ry.
4-9 g. 468 m. 278 lo. 6,782 cars.
E'n Div.: John Thomas, *Supt*.....Allegheny, Pa.
Geo. J. Parkin, *M. M*..... ....Allegheny, Pa.
D. M. Peppard, *M. M*........ . Crestline, O.
W'n Div.: John Thomas, *Supt*...Ft. Wayne, Ind.
F. D. Casanave, *M. M*........Ft. Wayne, Ind.
A. H. Somers, *Gen. For. Shops*...Chicago, Ill.
(8) Pittsburg, Cincinnati & St. Louis Ry.
4-9 g. 1,172 m. 336 lo. 6,482 cars.
Jas. McCrea, *Gen. Supt*........Columbus, O.
E. B. Wall, *Supt M. P. & M*. ....Columbus, O.
P. & Col. Div.: E. B Taylor, *Supt*. Dennison, O.
C. B. Street, *M. M*. ....Dennison, O.
Robt. Curtis, *M. M*..............Columbus, O.
Thos. Chamberlain, *M. C. B*... Columbus, O.
C. & M. V. Div.: W. F. Black, *Supt*.Zanesville, O.
Leroy Kells, *M. M*..... ....Cincinnati, O.
Daniel Jewell, *M. C. B*..... ....Lancaster, O.
Li. Mi. Div.: Ralph Peters, *Supt*....Cincinnati, O.
Leroy Kells, *M. M*...............Cincinnati, O.
Jos. Underwood, *Gen. Foreman*.Cincinnati,O.
Ind. Divs.: J. F. Miller, *Supt*.....Richmond, Ind.
W. W. Reynolds, *M. M* .....Logansport, Ind.
Chas. H. Starr, *M. C. B*......Logansport, Ind.
W. C. Arp, *Gen. For*......Indianapolis, Ind.
Chi. Div.: Chas. Watts, *Supt*..Logansport, Ind.
(9) Terre Haute & Indianapolis R. R.
4-9 g. 374 m. 83 lo. 2,868 cars.
Joseph Hill, *Gen. Supt*.........St. Louis, Mo.
C. R. Peddle, *P. Agt*.............St. Louis, Mo.
Geo. H. Prescott, *S. M. P. & M*.Terre Haute,Ind.
E. D. Carter, *M. C. B* ......Terre Haute, Ind.
Clinton Idler, *M. M*...... . Indianapolis, Ind.
Chas. Butler, *M. M*..... ....Effingham, Ill.
A. W. Quakenbush, *M. M*...Logansport, Ind.
Pennsylvania R. R. Co.'s Roads. (7 Gen. Divs.)
4-9 g. 2,704 m. 1,271 loco. 51,894 cars.
Chas. E. Pugh, *Gen Man*......Philadelphia, Pa.
Enoch Lewis, *Pur. Agt*.......Philadelphia, Pa.
John Reilly, *Supt. Trans*......Philadelphia, Pa.
T. N. Ely, *Gen. S. M. P*. (4 Gen. Divs.) Altoona, Pa.
(1) Pennsylvania R. R. Divs.
4-9 g. 1,105 m. 627 lo. 35,583 cars.
S. M. Prevost, *Gen Supt*. ....Altoona, Pa
Frank L. Sheppard, *Supt. M. P*..Altoona,Pa.
G. W. Strattan, *M. M*.. ....Altoona, Pa.
Jno. P. Levan, *Gen. Fore*... ....Altoona, Pa.
Phila. Div.: Tho. Gucker, *Supt*.Philadelphia, Pa.
H. D. Garrett, *M. M*....W. Philadelphia, Pa.
I. W. Van Houten, *Gen. For*......W. Phila., Pa
Mid. Div.: O. E. McClellan, *Supt*.Harrisburg, Pa.
E. L. Caum, *M. M*............Harrisburg, Pa.
Samuel W. Myers, *Gen. For*.Harrisburg, Pa.
Alt'a Div.: Jas. Reed, *Supt*.. ....Altoona, Pa.
Pitts. Div.: Robert Pitcairn, *Supt*....Pittsburg, Pa.
D. O. Shaver, *M. M*...... ....Pittsburg, Pa.
J. G. Stewart, *Gen. For*........Pittsburg, Pa.
W. Pa. Div.: A. P. Kirtland, *Supt*.Blairsville, Pa.
Wm. B. Norris, *M. M*..........Blairsville, Pa.
M. H. Fails, *Gen. For*..........Blairsville, Pa
Fred. Div.: J. B. Hutchinson, *Supt*.....York, Pa
Tyrone Div.: S. S. Blair, *Supt*........Tyrone, Pa.
Lew. Div.: Wm. M. Phillips, *Supt*.Lewistown, Pa.
Bed. Div.: Thos. A. Roberts, *Supt*...Bedford, Pa.
Monong. Div.: David M. Watt, *Supt*.Pittsburg, Pa.
Wm. Lininger, *M. M*.......... ....Pittsburg, Pa
(2) United R. Rs. of N. J. Divs. 414 m. 257 lo. 4,668 c.
F. Wolcott Jackson, *Gen. St*. Jersey City, N. J.
N.Y.Div.: Robt. E. Pettit, *Supt*.Jersey City,N. J.
H. S. Hayward, *St. M. P*...Jersey City, N. J.
David H. Baker, *Gen. For*.Jersey City, N. J.
L. A. Bosdevex, *M. M*. ..Jersey City, N. J.
E. F. Bosdevex, *Gen. For*..Jersey City, N. J.
Belv. Div.: J. A. Anderson, *Supt*.Lambertv., N. J.
R. McDowell, *M. M*......Lambertville, N. J.
Amboy Div.: I. S. Buckalew, *Supt*.Camden, N. J.
Thos. Kerr, *M. M*....... ....So. Amboy, N. J.
P. S. Bogart, *Gen. For*......So. Amboy, N. J.
(3) West Jersey R. R. 4-9 g. 163 m. 22 lo. 342 cars.
Joseph Crawford, *Supt*..........Camden, N. J.
W. McAllister, *M. M*..............Camden, N. J.
C. C. Williams, *Gen. For*........Camden, N. J.
(4) Phila., Wilm. & Balt. R.R. 212 m. 86 lo. 1,488 c.
H. F. Kenney, *Gen. Supt* ....Philadelphia, Pa.
S. A. Hodgman, *M. M*.........Wilmington, Del.
W. H. Lungren, *Gen. For*....Wilmington, Del.
Cen. Div.: T. A. Roberts, *Supt*..Philadelphia, Pa.
S. D. Danfield, *M. M. & C. B*....Chester, Pa.
Del. Div.: I. N. Mills, *Supt*......Wilmington, Del.
J. A. Baynard, *M. M*..............Oxford, Md.
C. E. Mason, *M. C. B*............. Oxford, Md.
Mid. Div.: H. H. Carter, *Supt*.......
(5) Phila. & Erie R. R. Divs.: 376 m. 117 lo. 3,481 c.
R. Neilson, *Gen. Supt*.... ...Williamsport, Pa.
A. O. Dayton, *Supt. Mo. Po*..Williamsport, Pa.
E'n. Div.: , *Supt*. Williamsport, Pa.
Sun.H. & W. Div: A. Walters, *Supt.;* and
H. K. Stout, *M. M*.... ....Sunbury, Pa.
Mid. Div.: E. B. Westfall, *Supt*.... ..Renova, Pa.
Wm. L. Holman, *M. M*..........Renova, Pa.
West'n Div.: J. W. Reynolds, *Supt*.....Erie, Pa.
W. T. Smith, *M. M*.............. ...Erie, Pa
(6) Northern Central Ry. 4-9 g. 326 m. 152 lo. 6,163c
Robert Neilson, *Gen. Supt*...Williamsport, Pa.
A. O. Dayton, *Supt. M. P*....Williamsport, Pa.
A. W. Sumner, *Pur. Agt*... ....Baltimore, Md.
Susq. Div.: A. Walters, *Supt*....Williamsport, Pa.
Sham. Div.: *Supt*..... ....Sunbury, Pa.
Elm. & Can. Divs.: S. Meade, *Supt*..Elmira, N.Y.
Jas. Strode, *M. M*...... ....Elmira, N. Y.
J. C. Dyott, *Gen. For*...... .....Elmira, N. Y.
Baltimore Div.: H. W. Knapp, *Supt*.Baltimore,Md.
(7) Balt. & Pot. & Alex. & Fred. 128 m. 29 lo. 356 c.
L. K. Lodge, *Gen. Supt*........Baltimore, Md
A. W. Sumner, *Pur. Agt*........Baltimore, Md.
J. M. Wallis, *Supt. Mo. Po*......Baltimore, Md.
J. M. Coale, *M. M*................Baltimore, Md.
G. W. Demarest, *Gen. For*......Baltimore, Md.
Penn. Coal Co.'s R. R. 4-3 g. 67 m. 23 eng. 2,871 c.
J. B. Smith, *Gen. Supt*. ....Dunmore, Pa
And. Crane, *M. M*. ....Dunmore, Pa.
Geo. W. Simpson, *M. C. B*.......Dunmore, Pa.
Pennsylvania & Erie R. R.—Early Branch.
C. R. Early, *Gen. Supt*...........Ridgeway, Pa.
Pensacola & Perdido R. R. 6 g. 8 m. 5 lo. 73 cars.
B. F. Simmons, *Pr. & Supt*.... Pensacola, Fla.
H. W. Simmons, *Pur. Agt*......Pensacola, Fla.
Peoria, Decatur & Evansville Ry.
4-8½ g. 254 m. 30 lo. 1,458 cars.
G. L. Bradbury, *Gen. Man*.... .... Peoria, Ill.
P. Reilly, *M. M*..................Mattoon, Ill.
Peoria & Farmington R. R. 4-8½ g. 25 m. 2 lo. 25 c.
D. P. Phelps, *Gen. Man*.........Monmouth, Ill.
John F. Wallace, *Supt*.... ....Farmington, Ill.
Peoria & Pekin Union Ry. 4-8½ g. 20 m. 12 lo. 100 c.
Thos. B. Burnett, *Gen. Supt. & P. A*.Peoria, Ill.
R. F. Hurd, *M. M. & C. B*.. ....Peoria, Ill.
Perkiomen R. R. 4-8½ gauge 39 miles.
D. B. Clack, *Supt*.....Perkiomen Junction, Pa.
Petersburg R. R. 4-8½ g. 64 m. 10 lo. 131 cars
R. M. Sully, *Gen. Supt*.........Petersburg, Va.
L. E. Clark, *Pur. Agt*..........Petersburg, Va.
R. B. Andrews, *M. M*..... .....Petersburg, Va.
J. W. Fleming, *M. C. B*........Petersburg, Va.
Phila., Wilmington & Balt. R. R. (*See Penna. R. R.*)
Phila. & Atlantic City Ry. 3-6 g. 54 m. 11 lo. 134 cars
F. S. Urie, *Supt. & Pur. Agt*..Philadelphia, Pa.
John T. Keihner, *M. M*...........Camden, N. J
E. Lippincott, *M. C. B*.... ......Camden, N. J.
Phila. & Reading. 4-8½ g. 486 m. 539 lo. 24,606 cars.
John E. Wootten, *Gen. Man*..Philadelphia, Pa.
W. S. Wilson, *Pur. Agt*. ....Philadelphia, Pa.
Geo. Eltz, *Supt. Trans*.... ....Reading, Pa.
L. B. Paxson, *Eng. of Mach*.......Reading, Pa.
No. Pa. & B. Brk. Div.:
I. A. Sweigard, *Supt*........Philadelphia, Pa.
Mah. & Sham. Br.:
J. H. Olhausen, *Supt*..... Mahoney Plane, Pa
Cat. & Willp't. Br.:
D. C. Reinhart, *Supt*. ......Williamsport, Pa.
M. Hill & S. Haven Br.:
A. A. Hesser, *Supt*............Cressona, Pa.
Sch. & Sus. Br.:
H. H. Tracy, *Supt*.... ......Pine Grove, Pa.
Read. & Col. Br.:
A. M. Wilson, *Supt* ....Columbia, Pa.
Pittsburg, Bradford & Buffalo Ry. 3 g. 31 m. 4 lo. 79c
J. M. Dickey, *Gen. Man*..........Foxburg, Pa.
W. D. Reed, *Supt*..... ......Foxburg, Pa.
Pittsburg, Cincinnati & St. Louis Ry. (*See Penna. Co.*)
Pittsburg, Ft. Wayne & Chicago Ry. (*See Penna. Co.*)
Pittsburg Southern Ry. 3 g. 38 m. 4 lo. 64 cars.
M. D. Hays, *Supt. & P. A*........Pittsburg, Pa.
W. S. Marshall, *M. M*............Pittsburg, Pa.
E. B. Gosline, *M. C. B*...... ....Pittsburg, Pa.
Pitts. & Castle Shannon R. R. 3-4 g. 9 m. 5 lo. 388 c.
James M. Bailey, *Gen. Supt*... Pittsburg, Pa.
Holmes Ward, *M. M* .....Castle Shannon, Pa.
Wm. E. Long, *M. C. B* .. .... Pittsburg, Pa.
Pitts. & Lake Erie R. R. 4-8¾ g. 70 m. 31 lo. 1,688 c.
W. C. Quincy, *Gen. Man*.........Pittsburg, Pa.
R. W. Jones, *Mast. Trans*...... Pittsburg, Pa.
S. W. Haines, *M. M*....... .....Pittsburg, Pa.
Pittsburg & Western R. R. 3 g. 47 m. 2 lo. 76 cars.
W. C. Mobley, *Gen. Supt*.........Pittsburg, Pa.
C. P. Ford, *Pur. Agt*. ....Allegheny, Pa.
W. L. Hofecker, *M. M*..........Zelienople, Pa.
Port Huron & No.-Western Ry. 3 g. 105 m. 4 lo. 66 c.
H. McMorran, *G. Man. & P. A*.Port Huron, Mich.
I. R. Wadsworth, *Supt*.. ...Port Huron, Mich.
Chas. Deifenbach, *M. M*......Port Huron, Mich.
Benj. Hillier, *M. C. B*........Port Huron, Mich.
Port Royal & Augusta Ry. 5 g. 112 m. 13 lo. 235 c.
J. N. Bass, *Supt*............ .. ....Augusta, Ga.
John McCann, *M. M*. ....Augusta, Ga.
J. H. Milton, *M. C. B*.............Augusta, Ga.
Portland & Ogdensburg. 4-8½ g. 114 m. 11 lo. 289 c.
J. Hamilton, *Gen. Supt. & P. A*..Portland, Me.
Geo. H. Poor, *M. M* ....Portland, Me.
W. G. Brewer, *M. C. B*.... .Portland, Me.
Portland & Rochester R. R. 4-8½ g. 52 m. 7 lo. 230 c.
J. W. Peters, *Supt. & Pur Agt*...Portland, Me.
E. H. C. Tompson, *For. of Mach*..Portland, Me.
David Dow, *For. of Car Repairs* Portland, Me
Potomac, Fred.'g & Pied. R. R 3 g. 38 m 2 lo. 38 c.
Will M. Grafton, *Supt*..... ...Fredericksburg,Va.
Pough., Hart. & Bos. R. R. 4-8½ g. 45 m. 4 lo. 64c.
J. A. Perkins, *Supt*.......Poughkeepsie, N. Y.
John L. Donaldson, *M. M*. Poughkeepsie, N. Y.
Prince Edward Island Ry. 3-6 g. 199 m. 17 lo. 280 c
Jas. Coleman, *Supt. & Pur. Agt.;*
Jos. Unsworth, *M. Supt. & Storekeeper;* and
D. M. Fraser, *M. C. B*.. .Charlottetown, P. E. I.
Prov., Warren & Bristol R. R. 4-8½ g. 19 m. 5 lo. 38 c.
Waterman Stone, *Supt*.. .. ..Providence, R. I.
Rufus Smith, *M. M. & C. B*....... ..Bristol, R. I.
Prov. & Springfield R. R. 4-8½ g. 23 m. 3 lo. 83 c.
Wm. Tinkham, *Gen. Man*.....Providence, R. I
G. T. Richardson, *M. M*.......Providence, R. I.
Prov. & Worcester. 4-8½ g. 66 m. 30 lo. 858 c.
W. E. Chamberlain, *Supt* .....Providence, R. I.
A. Griggs, *Supt. L. & C. D*....Providence, R. I.
Pullman's Palace Car Co. 472 passenger cars.
A. B. Pullman, *2d V.-Pr. & G. M*.. Chicago, Ill.
Geo. F. Brown, *Gen. Supt*...... ...Chicago, Ill.
Wm. A. Angell, *Pur. Agt*.... ......Chicago, Ill.
S. W. Bretzfield, *Asst. Pur. Agt*.New York,N.Y.
A. Rapp, *Man*. (Chicago Works)...Chicago, Ill.
H. L. Spaulding, *Man*.(Det.Shops).Detroit, Mich.
E. A. Benson, *Supt. Shops*... ....St. Louis, Mo

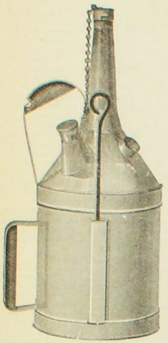
Q

Quebec Central Ry. 4-8½ g. 139 m. 3 lo. 79 cars.
A. Steele, *Supt*............... Sherbrooke, Que.
R. D. Morkill, *Pur. Agt*.......Sherbrooke, P. Q.
Jas. Seiveright, *M. M* ..... Sherbrooke, P. Q.
Quebec & Lake St. John Ry. 4-8½ g. 24 m. 3 lo. 43 c
J. G. Scott, *Manager*..............Quebec, Can
Frank Fournier, *Supt*... ...St. Raymond, P. Q
John T. Eames, *M. M*.. ....St. Raymond, P. Q.

R

Raleigh & Augusta Air-Line; Carolina Central.
Raleigh & Gaston R. Rs. 4-8½ g. 436 m. 47 lo. 994 c.
John C. Winder, *Gen. Man. & P. A*.Raleigh, N. C
Raleigh Rds. 4-8½ g. 194 m. 21 lo. 563 cars.
B. R. Harding, *Supt. of Mach*.Raleigh, N. C.
Carolina Cen. R.R. 4-8½ g. 242 m. 26 lo. 431 c.
L. C. Jones, *Gen. Supt*.....Wilmington, N. C.
James Maglenn, *M. of Mach*.Laurinburg, N. C.
S. R. Ethridge, *M. C. B* ....Laurinburg, N. C.
Rensselaer & Saratoga R.R.(*See Del. & Hud.Can.Co.*)
Rhinebeck & Connecticut. (*See Hart. & Ct. Wn.*)
Richmond, Fredericksburg & Potomac R. R.
4-8½ g. 83 m. 14 lo. 137 cars.
E. T. D. Myers, *Gen. Supt*..... Richmond, Va.
T. L. Courtney, *Asst. Supt*.......Richmond, Va.
H. Kuhn, *M. M*...................Richmond, Va.
W. H. Trainham, *M. C. B*.......Richmond, Va.
Richmond & Alleghany R.R. 4-9 g. 260 m. 19 lo. 837c
Decatur Axtell, *V. P. & Gen. Man*.Richmond, Va.
Geo. W. Agee, *Supt*...........Richmond, Va.

NOYES'
Patent Liquid and Condensed COOLER.



For Cooling Railroad Car and Steamboat Journals and Bearings of all Kinds, and for Mixing with Other Oils.

The attention of those who are running heavy journals is respectfully invited to the above Liquid Cooler. It has been successfully used for upward of ten years, and is constantly growing in favor, as its merits become known, and we are confident that practical men cannot fail of being convinced that our preparation deserves their candid attention. What we claim for it is:

That it will Cool a Hot Journal When in Motion, and extinguish the flame when the box is on fire; that its use will, in a great measure, prevent the occurrence of a hot journal, and save the expense, delays and annoyances incident thereto; that it will eliminate the heat from a journal at a temperature greatly below the point required to melt the babbitt, preventing the accumulation of heat, and by a timely application save it from destruction; that its non-inflammable elements (where waste is used) permeate the waste and prevent its taking fire; that it keeps the journal smooth and polished, preventing unnecessary friction; that its combination is based upon true scientific principles, which renders it impossible to fail in its results, and is the

Only Preparation that will Cool a Hot Journal while it is in motion, as attested by certificates below; that one thorough application on a hot journal will do more execution in cooling than the constant application of water for half an hour, besides doing it evenly and without loss of time.

Every Railroad Train or Steamboat should have a can of the Liquid Packing on board, with the directions for its use pasted upon it, and thus have always at hand the means of effectually cooling a hot journal, and thereby avoid the expense, danger and trouble from this cause.

WHAT RAILROAD MEN SAY OF IT.

Salem, Aug. 7, 1872.

Mr. P. Noyes.—*Dear Sir:* I have been using your Liquid Packing for cooling car journals for some time past, and have been well pleased with it. I have had occasion to use it a number of times, under Pullman cars, and it has been a complete remedy in every case of hot journals.

Every train should be provided with it, as it is a saving of time and expense in the running of trains, provided it is applied and cared for according to directions for using. Yours truly,

J. P. Somerby,
M. C. B Eastern Railroad.

Salem, Aug. 28, 1880.

I can recommend Noyes' Liquid Cooler as an excellent article to carry on trains for use in case of Hot Journals, which it cools, without injury to the journals, more effectually than anything I know of.

J. B. Billings,
M. C. B. Eastern Railroad.

Boston, April 7, 1880.

P. Noyes, Agent.—*Dear Sir:* Please send for account of Eastern Railroad five barrels Liquid Cooler.

Geo. J. Fisher, P. A.

Boston, May 24, 1877.

P. Noyes, Agent.—*Dear Sir:* Having used your Liquid Cooler two or three years, I find it necessary for the safe running of our cars to continue its use. When the cooler is mixed with black oil, according to directions, the compound is equal to lard or sperm oil, and it is the best Cooler I have ever used.

Yours truly, John F. Crockett,
Master Mechanic Boston, Lowell & Nashua R. R.

Boston, April 23, 1880.

Belt and Leather Stuffing Co.—*Gents:* Please send to East Cambridge, for account Boston & Lowell Railroad, five barrels Liquid Cooler.

Yours truly, F. H. Nourse,
Purchasing Agent.

Our Liquid Cooler is now in use, and has been from one to eight years, upon the following roads, and we have numerous recommendations from them: Boston & Maine R. R., Boston & Lowell R. R., Intercolonial R. R., Boston, Concord & Montreal R. R., Fitchburg R. R., Eastern R. R., New York, New Haven & Hartford R. R., New York & New England R. R., Connecticut River R. R., Delaware & Hudson Canal Co., Old Colony.

In ordering state whether it is desired for general Lubricating or Cooling. The Condensed is sold, especially for Lubricating, by the Pound, and the Liquid by the Gallon, as low as any article of the quality in the market.

SEND FOR A BARREL. NO CHARGE UNLESS IT DOES ALL WE STATE.

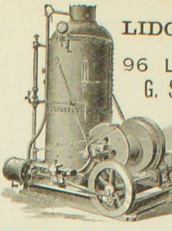
MANUFACTURED BY THE

NOYES MANUFACTURING CO., P. Noyes, General Manager.

47 INDIA STREET, BOSTON.

We are sole agents for the Swift "Muffler" for Locomotives, Improved Car Axle-Box Dust Guard, and are Agents for the Ormsby Patent Car-Sash Balance and Lock.

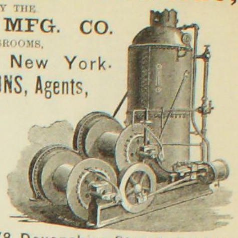
IMPROVED HOISTING ENGINES,



MANUFACTURED BY THE
LIDGERWOOD MFG. CO.
OFFICE AND SALESROOMS,
96 Liberty Street, New York.
G. S. WORMER & SONS, Agents,
Chicago, St. Louis and Detroit.

Over 150 different sizes and styles for ALL PURPOSES.

Also
MINING ENGINES,



J. H HOUGHTON, Eastern Agent, 178 Devonshire Street, Boston.

WM. SELLERS & CO., PHILADELPHIA,

MANUFACTURERS
MACHINE TOOLS AND TWEDDLE'S HYDRAULIC RIVETER.
THE 1876 INJECTOR BOILER-FEEDER
SIMPLE, RELIABLE AND EFFECTIVE.
Started, Regulated and Stopped by one Motion of a Lever.
Branch Office, 79 Liberty Street, NEW YORK.

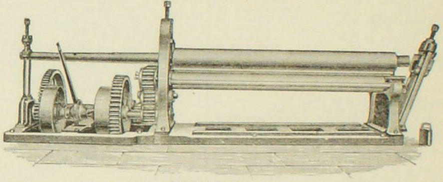
CHAINS

UNION CHAIN WORKS

REITER & CO.,
MANUFACTURERS OF ALL KINDS OF CHAINS
BRAKE CHAIN A SPECIALTY.
Twenty-Ninth and Railroad, Pittsburgh, Pa

PATENT PLATE BENDING ROLLS.

Built by HILLES & JONES.
WILMINGTON, DEL.



DESCRIPTION.

The annexed cut represents all sizes we make to be driven by belt. It will be seen at once that it is but the work of a moment to balance the top roll and lower the hinge housing, to take out the plate when a full circle is bent. The rolls are all made of Solid Wrought Iron, the Balance Bar being a part or extension of the top roll. There is a Cast-Iron Bed-Plate under the entire machine. To save any shifting of belts we put in Friction Pulleys, which enable the rolls to be started, stopped or reversedinstantly.

J. NOYES SMITH & CO.,

BUILDERS OF
NUT, BOLT AND WASHER MACHINERY
AND MANUFACTURERS OF
NUTS, BOLTS, WASHERS, PLOW BOLTS, Etc.
59 & 61 S. WATER ST., CLEVELAND, O.

WILLIAM A. HARRIS,

(ESTABLISHED 1864),
MANUFACTURER OF
HARRIS-CORLISS STEAM ENGINES
With Harris' Patented Improvements.
ALSO HEAVY AND LIGHT IRON AND BRASS CASTINGS
PROVIDENCE R. I.

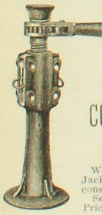
NATIONAL RAILWAY PATENT WASTE COMPANY.

The most economical, efficient and desirable material for packing JOURNAL BOXES of CARS is Cotton Seed Hulls.

The company proposes to license railroads to use this valuable article for packing, on very liberal terms Send for circular to

H. W. GUERNSEY, President,
240 Broadway, New York.

JOYCE, CRIDLAND & CO.,



Cor. Wyandotte St. and Railroad,
DAYTON, O.,
MANUFACTURERS OF
LEVER,
COMPOUND LEVER,
AND
Screw Jacks.

We make 27 varieties of these Jacks, and have more in process of construction.

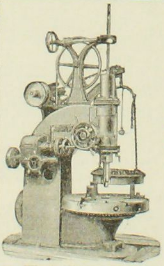
Send for Illustrated Catalogue and Price List.

THE PERRY SAFETY FREIGHT CAR COUPLING.

Several thousand of them are at work on the E. & T. H., C. & E. I., C., R. I. & P., T. H. & I., C., T. & M. C., St. P., M. & M., N. L. N., B. & M., Fitchburg, N. Y., P. & O., H. & C. W., Conn. R., C. V., N. Y. O. & W., N. Y., W. S. & B., G. T. R., N. Y., N. H. & H., N. Y. C. & H. R., N. Y. & N. E., N. Y., L. E. & W., D. & N., Naugatuck & Housatonic Railroads. Nine of these roads have adopted it for their freight cars. Trial lots may be had without royalty. Office of the Company, 236 La Salle Street, opposite of western entrance to Grand Pacific Hotel.

G. W. DORMAN, Secretary, W. V. PERRY, Gen'l Agt.

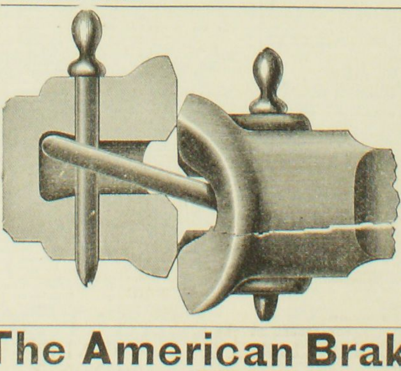
THE MACHINE TOOL WORKS.



ar Wheel Boring Machine. Awarded GOLD MEDAL.

FREDERICK B. MILES.
(Formerly FERRIS & MILES.)
TWENTY-FOURTH and WOOD STREETS, PHILADELPHIA, PA.
SEVEN PRIZE MEDALS, CHICAGO EXPOSITION, 1883,
FOR THE BEST
AXLE TURNING MACHINERY,
CAR WHEEL BORING AND TURNING MACHINE,
HYDRAULIC WHEEL PRESS,
IRON PLANING MACHINE,
RADIAL DRILLING MACHINE,
SLOTTING MACHINE,
STEAM HAMMER.

SAFFORD'S SAFETY DRAW-BAR.



"VICTORY OVER MORE THAN 30 CONTESTANTS."

Victory over more than 30 Self-Couplers in the Master Car-Builder's Convention of June, 1876. Also indorsement for safety in coupling by the Yard Masters, in their Convention, June, 1877, and by 300 others who were unable to attend the Convention, and 300 railroad officials who are resident in 26 States, and who admitted superiority over any other yet produced. Try 30 free of royalty, and see for yourself! Pattern free, and no change in timbers or connections. Those made by Wilson, Walker & Co., Pittsburgh, Pa., *will save 200 per cent. in repairs,* and give double life service over *old styles of* wrought iron. About 43,000 in use by 146 railroads. The *saving in repairs* by using *my invention* is from 20 per cent. to 80 per cent. as per *report of many officers.*

J. B. SAFFORD,
EAGLE IRON WORKS
BUFFALO, N. Y.

D. P. SLATTERY, President.
JOHN B. GRAY, Vice-Pres. and Gen. Agt.
E. B. LEIGH, Sec'y and Treas.

The American Brake Co.,

S. W. McMUNN, Supt.
A. BLAIR, Attorney.

MANUFACTURERS OF
AUTOMATIC FREIGHT CAR BRAKES AND STEAM DRIVER AND TENDER BRAKES,
ST. LOUIS, MO.

We offer to Railway Companies the only Exclusively Independent Self-Acting Freight Train Brake which has yet been adopted by any Railway in the World. Our Steam Driver and Tender Brake is acknowledged to be the Cheapest, Simplest and BEST Power Brake now in use. Is now used by over 50 different Railroads. We are willing to furnish any railroad company one or more sets of our Steam Driver and Tender Brake upon approbation of 60 or 90 days, to be returned at our expense if not satisfactory.

M. Sweeney, *Pur. Agt*..........Richmond, Va.
Geo. D. Harris, *M. M. & C. B*....Richmond, Va.
Richmond & Danville R. R. Co.'s Roads.
1,718 miles 218 loco. 3,616 cars.
T. M. R. Talcott, *Gen. Man*......Richmond, Va
J. P. Minetree, *Pur. Agt*........Richmond, Va
R. D. Wade, *Supt. Mo. Po*.......Richmond, Va.
(1) Rich. & Dan. R. R. 5 g. 829 m. 131 lo. 2,480 cars.
Peyton Randolph, *As. G. Man*..Richmond, Va.
Rich. & Dan. Div.: 5 g. 320 m. 80 lo. 1,797 c
Wm. H. Green, *Supt*..........Richmond, Va.
T. W. Gentry, *M. M*..........Richmond, Va.
J. B. Vaughan, *For. Car Sh*...Richmond, Va.
North Carolina Div. 5 g. 223 m. 22 lo. 268 cars.
A. B. Andrews, *Supt*..........Raleigh, N. C.
W. H. Turrentine, *M. M.* Comp'y's Shops, N. C.
J. C. Holt, *For. Car Sh.* Comp'y's Shop, N. C.
Atlanta & Char. Air Line. 5 g. 288m. 31 lo. 415 c.
Narrow-Gauge Branches. 3 g. 80 m. 5 lo. 37 c.
I. Y. Sage, *Supt*..................Atlanta, Ga
W. A. Walden, *M. M*............Atlanta, Ga
Z. T. Smith, *For. Car Sh*........Atlanta, Ga.
(2 Charlotte, Col. & Aug. R. R. 5g. 239 m. 22 lo. 287 c.
G. R. Talcott, *Supt*..........Columbia, S. C.
J. H. Green, *M. M.* (2 roads)...Columbia, S. C.
J. H. Perkins, *For. Car Sh*....Columbia, S. C.
(3) Columbia & Greenville R. R. 5 g. 297 m. 22 l. 218 c.
J. W. Fry, *Supt*...............Columbia, S. C.
J. O. Meredith, *For. K. & C. R'p*.. do.
(4) Virginia Midland Ry. 4–8½ g. 353 m. 41 lo 631 c.
W. M. S. Dunn, *Eng. & Supt.* Alexandria, Va.
J. E. Waddey, *M. of M*......Alexandria, Va.
J. T. Nalls, *M. C. B*.........Alexandria, Va
Richmond & Petersburg R.R. 4–8½ g. 25 m. 8 lo. 130 c
J. R. Kenly, *Supt*.............Richmond, Va.
John O'Brien, *M. M*...........Richmond, Va.
Rio Grande R. R. 3-6 g. 22 m. 3 lo 39 cars.
M. J. Gomila, *Rec. & Gen. Man* Brownsville, Tex.
G. W. Rendall, *M. M*.........Brownsville, Tex.
M. Markwood, *M. C. B*.......Brownsville, Tex.
Rochester & Pittsb'g. R.R. 4–8½ g. 134 m. 11 lo. 612 c
Geo. E. Merchant, *Gen. Man*...Rochester N. Y.
J. P. Hovey, *M. M*...........Rochester, N. Y.
Rock Island & Mercer County R. R., and
Rock I'd & Peoria Ry. 4–8½ g. 113 m. 12 lo. 357 c.
R. R. Cable, *V.-P. & Gen. Supt*..Rock Island, Ill.
R. I. & P. Ry.: H. B. Sudlow, *Supt. & P. A.* do.
Joseph Elder, *M. M*.................Peoria, Ill.
R. I. & M. C. Rd.: B. T. Cable, *Supt.* R'k Island, Ill.
J. H. Parks, *M. M*.............Rock Island, Ill.
Rome (Ga.) R. R. 5 g. 20 m. 2 lo. 13 cars.
Eben Hillyer, *Supt*..................Rome, Ga.
O. W. Harbin, *M. M. & C. B*.........Rome, Ga.
Rome, Watertown & Ogdensburg R. R.
4–8½ g. 409 m. 51 lo. 1,400 cars.
H. M. Britton, *Gen. Man*.........Oswego, N. Y
Geo. W. B. Cushing, *Pur. Agt.* New York, N. Y.
Geo. H. Haselton, *M. M. & C. B*..Oswego, N. Y.
Rumford Falls & Buckfield R.R. 4–8½ g. 29 m. 2 l. 42 c.
L. L. Lincoln, *Supt*..............Canton, Me.
O. Spaulding, *Pur. Agt*..........Buckfield, Me.
E. R. Oldham, *M. M*.............Buckfield, Me.

S

Sabine & East Texas Ry. 4–8½ g. 104 m 5 lo. 333 c.
R. H. Cousins, *Gen. Supt*.....Beaumont, Tex.
W. A. Meagher, *M. M*.........Beaumont, Tex.
Sacramento & Placerville R. R 4–8½ g. 49 m. 3 lo. 68 c.
J. B. Wright, *Supt. & P. A*....Sacramento, Cal.
A. J. Stevens *M. M*...........Sacramento, Cal.
Benj. Welch, *M. C. B*.........Sacramento, Cal.
Saginaw Bay & Northw'n R. R. 4–8½ g. 30 miles.
J. Jackson, *Gen. Man*..........Pinconning, Mich.
F. T. Lillote, *Act. Pur. Agt*...Pinconning, Mich
Edward Keeler, *M. M*.........Pinconning, Mich.
Saginaw Valley & St. Louis R. R. 4–8½g. 35 m. 4 l. 64 c
N. W. Merrill, *Supt*.............Saginaw, Mich.
Allan Bourn, *Pur. Agt*.............Detroit, Mich.
Geo. C. Watrous, *M. M*..............Iona, Mich.
San Francisco & No. Pac. 4–8½ g. 112 m. 11 lo. 244 c.
Arthur Hughes, *Gen. Man*..San Francisco, Cal.
H. C. Whiting, *Supt*..............Petaluma, Cal.
Ed. Reynolds, *Gen. M. M*.........Donahue, Cal.
Savannah, Florida & W'n Ry. 5 g. 422 m. 50 lo. 695 c.
H. S. Haines, *Gen. Man*........Savannah, Ga.
R. G. Fleming, *Supt*............Savannah, Ga
F. S. Pendergast, *Ch. Eng*.......Savannah, Ga.
A. A. Aveilhé, *Pur. Agt*..........Savannah, Ga.
G. M. D. Riley, *M. of Mach*.......Savannah, Ga
Jos. W. Rowell, *For. Car Dept* Savannah, Ga.
Sav., Griffin & No. Ala. R. R. *Op. by Central (Ga.).*
Schuylkill & Lehigh R. R. 4–8½ g. 43 miles.
Eldredge Dale, *Supt*..................Reading, Pa.
Scoharie Valley R. R *(See Middlebury & Sch.)*
Scioto Valley R. R. 4–8½ g. 131 m. 15 lo. 460 cars.
Geo. Skinner, *Supt*..................Columbus, O
R. Bromley, *M. M. & P. A*.....Portsmouth, O.
Seaboard & Roanoke R. R. 4–8½ g. 80 m. 21 lo. 381 c.
E. G. Ghio, *Mast. of Trans*....Portsmouth, Va.
M. M. Pendleton, *S. M. P. & M.* Portsmouth, Va.
Shenandoah Valley R. R. 4–8½ g. 143 m. 15 lo. 104 c.
J. H. Sands, *Supt*.................Roanoke, Va.
W. C. De Armond, *Pur. Agt*..Philadelphia, Pa.
Chas. Blackwell, *Supt. of M. P*..Roanoke, Va.
W. Welch, *M. M*.....................Roanoke, Va.
Shenango & Allegheny R R 4–9½ g. 47 m. 6 lo. 156 c.
J. T. Blair, *G. Supt. & Pur. Agt.* Greenville, Pa.
Edw. Richardson, *M. M. & C. B.* Greenville, Pa.
Shepaug R. R. 4–8½ g. 38 m. 3 lo. 27 cars.
Edwin McNeill, *Supt*............Litchfield, Ct.
C. M. Allen, *M. M*................Litchfield, Ct.
Ship Is., Ripley & Ky. R. R. 3 g. 25 m. 2 lo. 23 cars.
C. L. Harris, *Supt. & Pur. Agt*....Ripley, Miss.
W. H. Phelps, *M. M*..................Ripley, Miss
Sioux City & Pacific R. R. 4–8½ g. 427 m. 21 lo. 594 c.
P. E. Hall, *Gen. Man. & P. A.* Cedar Rapids, Ia.
C. M. Lawler, *Gen. Supt*...Missouri Valley, Ia.
J. S. Wattles, *Supt*........Missouri Valley, Ia.
C. F. McCoy, *Asst. Supt*..............Blair, Neb.
S. A. Teal, *M. M*..............Missouri Valley, Ia.
W. H. Ramseyer, *M. C. B*...Missouri Valley, Ia.
Sodus Bay & Southern Ry. 4–8½ g. 34 m. 4 lo. 40 c.
S. B. Stuart, *Supt. & Pur. Agt.* Sodus Point, N. Y.
C. H. Hill, *M. C. B*............Sodus Point, N. Y.
South Carolina Ry. 5 g. 243 m. 42 lo. 685 cars.
John B. Peck, *Gen. Man*........Charleston, S. C.
S. B. Pickens, *Pur. Agt*........Charleston, S. C.
P. J. Cochrane, *Mast. of Mach.* Charleston, S. C.
Geo. H. Gramling, *M. C. B*....Charleston, S. C.
South-Eastern Ry. 4–8½ g. 260 m. 26 lo. 826 cars.
Bradley Barlow, *Gen. Man*......Montreal, Can.
T. A. McKinnon, *Asst. Man*.....Montreal, Can.
H. A. Alden, *Supt*..............W. Farnham, P. Q.
A. G. Eastman, *M. M*..........W. Farnham, P. Q.
South Florida R. R. 3 gauge 40 m. 4 lo. 20 cars.
B. R. Swoope, *Supt. & P. A*.......Sanford, Fla.
C. C. Haskell, *Pur. Agt*...........Sanford, Fla.
J. A. Campbell, *M. M*.............Sanford, Fla.
A. D. Stentiford, *M. C. B*........Sanford, Fla.
South Mountain R. R. 4–8½ g. 18 m. 4 lo. 22 c.
W. H. Woodward, *Supt.* Pine G've Furnace, Pa.
South Pacific Coast R. R. 3 g. 81 m. 10 lo. 260 cars.
A. H. Fracker, *Gen. Supt*..San Francisco, Cal.
G. H. Waggoner *Pur. Agt*..San Francisco, Cal.
E. L. Reese, *M. M. & C. B*..........Newark, Cal.
South-Western R. R. (Ga.) *(See Central of Ga.)*
South-Western Ry. (Ky.) 4–8½ g. 4 m. 1 lo. 38 cars.
J. M. Wilson, *Supt*..............Harrodsburg, Ky.
J. Tomlinson, *Pur. Agt*.........Harrodsburg, Ky.
Southern Central R. R. 4–8½ g. 115 m. 16 lo. 447 c.
James G. Knapp, *Supt. & Pur. Agt.* Auburn, N. Y.
Chas. G. Brown, *M. M*................Auburn, N. Y.
H. Mooney, *M. C. B*...................Auburn, N. Y.
Southern Maryland R. R. 4–8½ g. 20 m. 1 lo. 5 c.
Robert Knight, *Supt*............Brandywine, Md.
C. R. Joyce, *M. M*..............Brandywine, Md.
Southern Pacific R. R. 4–8½ g. 198 m. 30 lo. 728 c.
Northern Div. *(For other Divs. see Cen. Pac.)*
A. C. Bassett, *Supt*..........San Francisco, Cal.
J. R. Watson, *Pur. Agt*.......Sacramento, Cal.
J. T. Wilson, *M. M*...........San Francisco, Cal.
F. N. Bellisle, *M. C. B*......San Francisco, Cal.
Spring Hill & Parrsboro Ry. 4–8½ g. 32 m. 1 lo. 64 c.
J. A. Killam, *Gen. Man*.........Parrsboro, N. S.
K. McKinnon, *M. M*............Parrsboro, N. S.
St. Croix & Penobscot R. R. 4–8½ g. 22 m. 4 lo. 195 c.
S. W. Haycock, *Supt. & Pur. Agt.* Calais, Me.
G. H. Corsen, *M. M*.................Milltown, Me.
H. C. Tincker, *M. C. B*............Milltown, Me.
St. John's Ry 4–8½ g. 14½ m. 2 lo. 24 cars.
R. McLaughlin, *Pr. & Supt*..Jacksonville, Fla.
Geo. Ferro, *M. of Mach*...................Tocoi, Fla.
St. Johnsb'ry & Lake Champ 4–8½ g. 120 m 10 lo. 297 c.
A. B. Jewett, *Supt. & P. A*..St. Johnsbury, Vt.
Geo. E. Howe, *M. M. & C. B.* St. Johnsbury, Vt.
St. Joseph & Des Moines R. R. *(See K. C., St. J. & C. B.)*
St. Lawrence & Ottawa Ry, 4–8½ g. 59 m. 10 l. 146 c.
Archer Baker, *Gen. Supt*.........Montreal, Ont
R. Blackwell, *Mech. Supt*.........Montreal, Ont.
St. Louis, Alton & Terre Haute R. R.
Main Line. *(See Ind. & St. L. Div.; Ohio Ry.)*
St. Louis & Cairo Div.: 4–8½ g 137 m. 17 lo. 778 c.
G. W. Parker, *Gen. Man*......St. Louis, Mo.
J. L. Hinckley, *Supt*..........Belleville, Ill.
A. M. De Clerq, *M. M*..........St. Louis, Mo.
St. Louis Bridge Co. and Tunnel R. R.
4–8½ g. 27 m. 18 lo. 11 cars.
Wm. Taussig, *Gen. Man*..........St. Louis, Mo.
A. W. Dickinson, *Supt*...........St. Louis, Mo.
J. E. Williams, Jr., *Pur. Agt*....St. Louis, Mo.
H. M. Smith, *M. M*.................St. Louis, Mo.
St. Louis Coal R. R. 4–8½ g. 28 m. 1 lo. 78 cars.
Jas. Prentice, *Supt*..............Carbondale, Ill.
Jas. C. Bryden, *Pur. Agt*.........St. Louis, Mo.
St. Louis, Ft. Scott & Wichita R.R. 4–8½ g. 128 miles.
F. Tiernan, *V. P. & Gen. Man*..Fort Scott, Kan.
J. W. Miller, *Gen. Supt*.........Fort Scott, Kan.
Henry Berger, *M. M*..............Ft. Scott, Kan.
A. A. Tiddell, *M. C. B*...........Ft. Scott, Kan.
St. L., Hannibal & Keokuk. 4–8½ g. 85 m. 5 lo. 65 c.
W. W. Walker, *Gen. Supt*.......Hannibal, Mo.
Geo. Douglass, *Pur. Agt*.........Hannibal, Mo.
St. Louis, Iron Mt. & So'n Ry. *(See Mo. Pacific Ry.)*
St. L. Keokuk & No.-W'n. 4–8½ g. 187 m. 14 lo. 312 c.
R. Law, *Gen. Supt*....................Keokuk, Ia.
G. B. Harris, *Pur. Agt*..............Chicago, Ill.
Wm. H. Bartlett, *M. M*..............Keokuk, Ia.
St. L., Salem & Little Rock. 4–9 g. 69 m. 5 lo. 103 c
H. A. Crawford, *V. Pr. & P. A*...St. Louis, Mo.
E. B. Sankey, *Supt*......................Salem, Mo.
Thomas Everson, *M. M*..........Steelville, Mo.
J. W. Houston, *M. C. B*..........Steelville, Mo.
St. L., Van. & T. H. *(See T. H. & I. Div. of Penna. Co.)*
St. Louis & Cairo R. R. 3 g. 152 m. 22 lo. 896 cars.
Chas. Hamilton, *Gen. Supt*......St. Louis, Mo.
R. M. Pringle, *M. M*...............St. Louis, Mo.
St. L. & San Fran. Ry. 4–8½ g. 854 m. 80 lo. 2,700 c.
C. W. Rogers, *V. P. & Gen. Man*..St. Louis, Mo.
D. H. Nichols, *Mast. Tran*..No. Springfield, Mo.
A. G. Thompson, *Pur. Agt*.........St. Louis, Mo.
M. Kearney, *M. M. & C. B*..No. Springfield, Mo.
Mo. & Ark. Div.: W. A. Thoms, *Supt.* do.
Kan. Div.: J. R. Wentworth, *Supt.* Neodesha, Kan.
St. Martin's & Upham Ry. 4–8½ g. 30 m. 2 lo. 8 cars.
A. E. Killam, *Manager*.........St. Martin s, N. B.
St. Paul, Minneapolis & Manitoba Ry.
4–8½ g. 1,125 m. 168 lo. 4,331 cars.
A. Manvel, *Gen. Man*.............St. Paul, Minn.
E. B. Wakeman, *Asst. Gen. Supt.* St. Paul, Minn.
J. C. Morrison, *Pur. Agt*.........St. Paul, Minn.
H. Middleton, *M. M. & C. B*.....St. Paul, Minn.
Breck. Div.: A. Guthrie, *Supt*....St. Paul, Minn.
F. F. Div.: J. B. Rice, *Supt*........St. Paul, Minn.
No'n Div.: D. K. Smith, *Supt*....Crookston, Minn.
St. Paul & Duluth R.R. 4–8½ g. 196 m 24 lo. 580 c.
H. P. Breed, *Asst. Gen. Supt*....St. Paul, Minn.
J. G. Callahan, *Pur. Agt*.........St. Paul, Minn.
W. McFarland, *M. M*..............St. Paul, Minn.
John Hill, *M. C. B*..................St. Paul, Minn.
Sterling Mountain Ry. 6 g. 8 m. 2 lo. 145 cars.
J. C. Missimer, *Supt*..........Sloatsburg, N. Y.
Syracuse, Binghamton & N. Y. R. R. *(See D. L. & W.)*
Syracuse, Chenago & N. Y. 4–8½ g. 44 m. 4 lo. 60 c.
Albert Allen, *Supt*................Syracuse, N. Y.
George W. West, *M. M*...........Syracuse, N. Y.
Wm. J. McMichael, *M. C. B*... Syracuse, N. Y.
Syracuse, Geneva & Corning; Corning, Cowanasque & Antrim R. Rs. 4–8½ g. 121 m. 28 lo. 1,044 c.
A. H. Gorton, *Supt*...............Corning, N. Y.
W. E. Gorton, *Asst. Supt*........Corning, N. Y.
Andrew Beers, *Pur. Agt*..........Corning, N. Y.
O. C. Patchell, *M. M*..............Corning, N. Y.
C. J. Butler, *M. C. B*..............Corning, N. Y.

T

Terre Haute & So.-Eastern Ry. 4–9 g. 40 miles.
Geo. Atherton, *Supt*..........Terre Haute, Ind.
Texas-Mexican; and Mexican National Rys.
3 g. 333 m. 28 lo. 600 cars.
G. C. Gardner, *Gen. Man*.....New York, N. Y.
W. E. Lewis, *Supt*..................Mexico, Mex.
J. Dougherty, *Pur. Agt*........New York, N. Y.
No Div.: F. A. Lister *G. M.* .Corpus Christi, Tex.
P. J. Milan, *M. M. & C. B*. do.
Mex. Nat. Ry.: J. M. Winslow, *M. M* Mexico, Mex.
Jno. Scullen, *Gen. Man*..........Mexico, Mex
Texas Western Ry. 3 g. 42 m. 2 lo. 34 cars.
E. L. Heriot, *Gen. Man*...........Houston, Tex.
J. W. Goodwin, *Supt*.............Houston, Tex.
T. F. Glispin, *M. M*..............Houston, Tex.
Texas & New Orleans; Louisiana W'n R. Rs.
4–8½ g. 217 m. 25 lo. 900 c.
A. N. Towne, *Gen. Man*..........Houston, Tex.
P. B. Watson, *Pur. Agt*..........Houston, Tex.
C. A. Burton, *Supt*................Houston, Tex.
D. C. Smith, *M. M*.................Houston, Tex.
J. M. Mather, *M. C. B*............Houston, Tex.
Texas & Pacific. *(See Mo. Pac. Ry.)*
Texas & St. Louis Ry. 3 g. 304 m. 19 lo. 338 cars.
G. W. Ristine, *Gen. Man*.........St. Louis, Mo.
J. B. Van Dyne, *Gen. Supt*...........Tyler, Tex.
A. S. Horner, *Supt*..............Texarkana, Kan.
F. W. Paramore, *Pur. Agt*........St. Louis, Mo.
L. B. Fish, *Pur. Agt*..................Tyler, Texas.
G. W. Prescott, *S. M. P. & M*.....St. Louis, Mo.
Tioga and Elmira State Line R. Rs.
4–8½ and 6 g. 54 m. 17 lo. 953 cars.
L. H. Shattuck, *Supt*..............Blossburg, Pa.
J. A. Hardenburg, *Pur. Agt*.. New York, N. Y.
Pere Bonny, *M. M*..................Blossburg, Pa.
D. H. Stratton, *M. C. B*..........Blossburg, Pa.
Toledo, Ann Ar. & Gr. Tr. Ry. 4–8½ g. 84 m. 9 lo. 150 c.
J. M. Ashley, *Gen. Man*.......Ann Arbor, Mich.
H. W. Ashley, *Supt. & Pur. Agt.* do
C. C. Dodge, *M. M*.............Ann Arbor, Mich.
Toledo, Cin. & St. Louis R. R. 3 g. 465 m. 63 lo. 2,200 c.
E. E. Dwight, *Gen. Man*..............Toledo, O.
F. W. Stewart, *P. Agt*.................Toledo, O.
L. James, *Supt. Mach*..................Toledo, O.
Tho. Robertson, *M. M*..............Delphos, O
Toledo Div.: W. H. Vandagrift, *Supt.*; and
J. G. Clifford, *M. M*..............Delphos, O.
C. H. Mead, *Gen. M. C. B*.........Delphos, O.
Del. & Cin. Divs.: D. T. Bacon, *Supt*......Cin., O.
L. Parisoe, *M. M*....................Dayton, O.
St. Louis Div.: M. B. Mann.......Charleston, Ill.
So. Ea'n Div.: A. W. Salter..........Dayton, O.
Tonawanda Valley & Cuba and Bradford, Eldred & Cuba R. Rs. 3g. 19 m. 1 lo. 13 cars.
L. G. Wiggins, *Supt*...............Bradford, Pa.
Toronto, Grey & Bruce Ry. 4–8½ g. 191 m 20 lo 446 c.
Edmund Wragge, *Gen. Man*.....Toronto, Can.
W. Watson, *Pur. Agt*.............Toronto, Can.
David Preston, *M. M*............Toronto, Can.
Troy & Boston R. R. 4–8½ g. 48 m. 20 lo. 484 cars.
D. Robinson, *Pres. & Pur. Agt*......Troy, N. Y.
Joseph Crandell, *Supt*..................Troy, N. Y.
Z. B. Davis, *M. M*.......................Troy, N. Y.
R. V. Coon, *M. C. B*....................Troy, N. Y.
Tuckerton R. R. 4–8½ g. 31 m. 2 lo. 28 cars.
J. J. Pharo, *Supt*...............Tuckerton, N. J.

U

Ulster & Delaware R. R. 4–8½ g. 74 m. 10 lo. 214 cars.
Jas. H. Jones, *Supt*..............Rondout, N. Y.
Joseph Rush, *M. M*...............Rondout, N. Y.
John H. Decker, *M. C. B*........Rondout, N. Y.
Union Pacific Ry. (5 Gen. Divs.)
3 & 4–8½ g. 4,286 m 510 lo. 10,550 cars.
S. H. H. Clark, *Gen. Man*.........Omaha, Neb.
Thos. L. Kimball, *Asst. Gen Man.* Omaha, Neb.
M. H. Goble, *Pur. Agt*.............Omaha, Neb.
I. H. Congdon, *S. M. P. & C. D*...Omaha, Neb
John Wilson, *Asst. do*...............Omaha, Neb.
(1) Neb. Div.: P. J. Nichols, *Gen. Supt*..Omaha, Neb.
E. Div.: C. B. Havens, *Supt*.........Omaha, N. B.
R. McConnell, *M. M*................Omaha, Neb.
A. M. Collett, *M. C. B*..............Omaha, Neb.
St. J. & W. Div.: L. D. Tuthill, *Supt.* St. Joseph, Mo.
E. Sleppy, *M. M*.....................G. Island, Neb.
Moun. Div.: W. A. Deuel, *Supt*..Cheyenne, W. T.
J. H. McConnell, *M. M*..........N. Platte, Neb.
R. McDougall, *M. M*...............Cheyenne, W. T.
(2) Wy. Div.: E. Dickenson, *Gen. Supt*..Laramie, W. T.
Laramie Div.: E. Dickenson, *Gen. Supt* do.
T. E. Lewis, *M. M*.....................Laramie, W. T.
T. A. Davis, *M. M*.....................Rawlins, W. T.
Wes Div.: C. E. Wurtelle, *Supt.* Evanston, W. T.
Geo. F. Chapman, *M. M*..........Evanston, W. T.
(3) Idaho Div.: W. B. Doddridge, *Gen. Supt.* Ogden, U.
Og. S. L. Div.:
R. Blickensderfer, *Supt*.........Pocatello, Id.
W. H. Lewis, *M. M*.............Montpellier, Id.
S. L. & W. Div.:
W. W. Ritter, *Supt*........S. Lake City, Utah.
U. & N. Div.:
R. Blickensdorfer, *Supt*.........Pocatello, Id.
R. Croft, *M. M*........................Logan, Utah.
F. Reardon, *M. M*..................Eagle Rock, Id.
(4) Col. Cent. Div.: A. A. Egbert, *Gen. Supt.* Denver, Col.
C. C. Div.: P. Toughy, *Supt*..........Denver, Col
F. Meirtsheimer, *M. M*..............Denver, Col.
So. Park Div.: G. W. Evans, *A. Supt* Como, Col.
F. Meir sneimer, *M. M*...............Denver, Col.
(5) Kan. Div.: F. T. Smith, *G. Supt*..Kansas City, Mo.
K. Val. Div.: J. O. Brinkerhoff, *Supt.* Kan. C'y, Mo.
Jas. Mackenzie, *M. M*.........Armstrong, Kan.
Kan. Cent. Div.:
N. T. Kelley, *Supt*..............Leavenworth, Kan.
Smo. Hill Div.:
O. H. Dorance, *Supt*.............Wallace, Kan.
J. B. Dailey, *M. M*......................Ellis, Kan.
United States Rolling Stock Co. 23 lo. 4,834 cars.
A. Hegewisch, *Pres*..............New York, N. Y.
C. F. Jauriet, *Gen. M. M*...........Chicago, Ill.
W. H. Chaddock, *Pur. Agt*.........Chicago, Ill.
Utah Central Ry. 4–8½ g. 280 m.
John Sharp, *Gen. Supt*...Salt Lake City, Utah.
S. H. Hill, *Pur. Agt*.......Salt Lake City, Utah.
W. B. Armstrong, *M. M*..Salt Lake City, Utah.
Peter Reid, *M. C. B*.......Salt Lake City, Utah.
Utah & Nevada Ry. 3 g. 37 m.
W. W. Ritter, *Gen. Man*...Salt Lake City, Utah.
Robert Anderson, *M. M*...Salt Lake City, Utah.
Utah & Pleasant Valley Ry. 60 m.
G. M. Young, *Man*.........Salt Lake City, Utah.
Utica, Ithaca & Elmira Ry. 4–8½ g. 120 m. 11 lo. 152 c.
C. R. Fitch, *Supt*......................Elmira, N. Y.
C. J. Howe, *M. M. & M. C. B*..Breesport, N. Y.
Utica, & Black Riv. R. R. 4–8½ g. 180 m. 22 lo. 329 c.
J. F. Maynard, *Gen. Man. & P. A*..Utica, N. Y.
John Bailey, *M. M*........................Utica, N. Y.
David James, *M. C. B*....................Utica, N. Y.

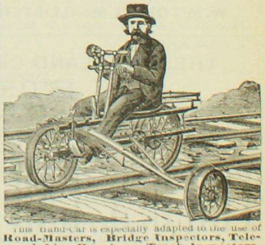
V

Vaca Vall. & Clear Lake R. R. 4–8½ g. 30 m. 2 lo. 19 c.,
G. B. Stevenson, *Gen. Supt*.......Vacaville, Cal.
Valley Ry. 4–8¾ g. 59 m. 10 lo. 317 cars.
J. E. Turk, *Supt. & P. Agt*.......Cleveland, O
Chas. Blanchard, *M. C. B*.........Cleveland, O
Vernon, Greensburg & Rushville R. R. 25 m.
Horace Scott, *V.-Pres*...........Greensburg, Ind.
Virginia Midland Ry. *(See Rich. & Dan.)*
Virginia & Truckee R. R. 4–8½ g. 54 m. 17 lo. 375 c.
Carson & Colorado R. R. 3 g. 158 m. 4 lo. 76 c
H. M. Yerington, *Gen. Supt*........Carson, Nev.
R. J. Laws, *Supt.* (C. & Col.).......Carson, Nev.
Hume Yerington, *Pur. Agt*..........Carson, Nev.
I. N. Fording, *M. M*..................Carson, Nev.
B. F. Lyon, *M. C. B*..................Carson, Nev.

W

Wabash, Chester & W'n R. R. 4–8½ g. 42 m. 2 lo. 32 c
J. L. Hinckley, *Gen. Supt*.............Chester, Ill
Wabash, St. Louis & Pacific Ry. (3 Gen. Divs.
4–8½ g. 3,241 m 598 lo. 17,230 cars.
John C. Gault, *2d V. P*...............St. Louis, Mo.
Robert Andrews, *Gen. Supt*.....St. Louis, Mo.
R. B. Lyle, *Pur. Agt*.................St. Louis, Mo.
Jacob Johann, *Gen. M. M*......Springfield, Ill.
U. H. Kohler, *Gen. M. C. B*............Toledo, O.
(1) Eas'n Div.: J. B. Barnes, *M. M.* Fort Wayne, Ind.
Oh. & Ind. Div.: G. W. Stevens, *Supt.* Ft. Wayne, Ind.
Peru Div.: E. C. Murphy, *Supt*..........Peru, Ind.
John McKenna, *M. M*....................Peru, Ind.
Cairo Div.: D. G. Moore, *Supt*..........Cairo, Ill
W. S. Morris, *M. M*......................Carmi, Ill
(2) Middle Div.: R. M. Hemphill, *M. C. B.* Peoria, Ill
Ill. Div.: H. F. Clark, *Supt*........Springfield, Ill.
B. B. Rose, *M. C. B*..................Decatur, Ill.
Chicago Div.: E. N. Armstrong, *Supt.* Chicago, Ill
Peoria Div.: F. L. Tomkins, *Supt*.....Peoria, Ill
Rant'l Div.: B. F. Mathias, *Supt*.....Rantoul, Ill.
J. McCarthy, *M. M*....................Rantoul, Ill.
(3) Western Div.: W. H. Selby, *M. M*...Moberly, Mo
C. S. Buck, *M. C. B*....................Moberly, Mo
Missouri Div.: R. S. Miner, *Supt*...Moberly, Mo.
C. B. & O. Div.: J. W. Blanchard, *Supt.*; and
J. S. Hazen, *M. C. B*...............Stanberry, Mo)
Quincy Div.: F. D. Schermerhorn, *S*..Quincy, Ill,
Iowa Div.: E. Dresser, *Supt*..............Keokuk, Ia
D. Moin. Div.: H. B. Skeele, *Supt*..Des Moines, Ia.
Walla Walla & Columbia Riv. R. R. *(See Ore. Ry.*
Walkill Ry. *(See N. Y., West. Sh. & B.*
Washington, Ohio & West. R. R. 4–8½ g. 52 m. 5 lo. 83 c.
S. M. Brophy, *Supt*..............Alexandria, Va.
Edward Dunn, *M. M*..............Alexandria, Va.
John Harrison, *M. C. B*.........Alexandria, Va.
Waynesburg & Washington Rd. 3 g. 29 m. 3 lo. 26 c.
C. E. Bower, *Supt*...............Waynesburg, Pa.
A. M. Kline, *M. C. B*............Waynesburg, Pa.
Welland Ry. 4–8½ g. 25 m. 3 lo. 147 cars.
William Pay, *Supt*............St. Catharines, Ont.
Jas. Taylor, *M. M*............St. Catharines, Ont
Wm. H. Pay, *M. C. B*........St. Catharines, Ont
West End Narrow Gauge Ry. 3 g. 16 m
Rolla Wells, *Supt*.....................St. Louis, Mo
M. M. Hodgman, *M. M*...............Florissant, Mo.
West Feliciana R. R. 4–8½ g. 27 m. 2 lo. 22 cars
J. B. McGehee, *Pr. & Gen. Supt.* Bayou Sara, La.
J. A. Tilton, *M. M. & C. B*......Bayou Sara, La.
West Virginia, Central & Pittsb'g Ry. 13 m 3 lo. 19 c.
W. E. Porter, *Gen. Supt*......Piedmont, W. Va.
W. T. Blackiston, *Pur. Agt*....Piedmont, W. Va.
E. W. Lippencott, *M. M. & M. C. B*. Piedmont.
Western R. R. (of Ala.) 5 g. 88 m. 15 lo. 270 cars.
Atlanta & W. Point Rd. 5 g. 87 m. 14 lo. 20 c.
Cecil Gabbett, *Gen. Man. & Supt*...Mont., Ala.
C. D. Wall, *M. M*...............Montgomery, Ala.
F. M. Wade, *M. C. B*...........Montgomery, Ala.
Western Counties' Ry. 4–8½ g. 67 m. 8 lo. 137 cars.
J. Brignell, *Supt*..............Yarmouth, N. S.
Western Maryland R. R. 4–8½ g. 157 m. 16 lo. 394 c.
J. M. Hood, *Pr. & Gen. Man*....Baltimore, Md.
R. J. Adair, *Pur. Agt*..............Baltimore, Md.
David Holtz, *Mast. of Mach.* Union Bridge, Md.
J. H. Nussear, *M. C. B*........Union Bridge, Md.
Western No. Carolina R. R. 5 g. 155 m. 6 lo. 36 c.
V. E. McBee, *Supt*.................Salisbury, N. C.
Jos. P. Minetree, *Pur. Agt*......Richmond, Va.
G. W. Gates, *M. M*.................Salisbury, N. C.
Western & Atlantic R. R. 5 g. 138 m. 48 lo. 952 c.
R. A. Anderson, *Gen. Supt*.........Atlanta, Ga.
A. B. Bostwick, *Asst. Supt*.........Atlanta, Ga.
Pur. Agt.........Atlanta, Ga.
John H. Flynn, *M. M. & C. B*.....Atlanta, Ga.
Wheeling & Lake Erie R. R. 168 miles.
M. D. Woodford, *Gen. Man*............Toledo, O.
O. P. Dunbar, *Gen. M. M*.............Norwalk, O.
John Hillhouse, *Div. M. M*...........Norwalk, O.
White Water R. R. *(See Ft. W., Cin. & Lou.)*
Wilmington & No'n R. R. 4–8¾ g. 77 m. 13 lo. 148 c.
J. H. Thompson, *Supt. & P. A*..Coatesville, Pa.
George Rommel, *M. M*...........Coatesville, Pa
Alex. Maitland, *M. C. B*.........Coatesville, Pa.
Wilmington & Weldon; Northeastern; S. C. Central; Cheraw & Darlington; Cheraw & Salisbury; and Wilmington, Columbia & Augusta R. Rs.
5 g. 599 miles 70 locomotives 1,120 cars.
R. R. Bridgers, *Gen. Man*.....Wilmington, N. C.
J. F. Divine, *Gen. Supt*.......Wilmington, N. C.
John Bisset, *M. M*.............Wilmington, N. C.
W. H. Day, *M. C. B*...............Florence, S. C.
C. R. Clowe, *M. C. B.* (W. & W.). Wilmington, N. C.
Windsor & Annapolis Ry. 4–8½ g. 130 m. 10 lo. 156 c.
P. Innes, *Gen. Man*...............Kentville, N. S.
Wm. Yould, *M. M*.................Kentville, N. S.
Wm. Grierson, *M. C. B*...........Kentville, N. S.
Wisconsin Central R. R. 4–8½ g. 480 m 9 lo. 1 608 c.
F. N. Finney, *Gen. Man*..........Milwaukee, Wis.
E. K. Howes, *Pur. Agt*............Milwaukee, Wis.
W. A. Short, *Supt. M. P. & M*...Stevens Pt., Wis.
Mil. & E'n Divs.: A. A. Allen, *S*..Milwaukee, Wis.
Wis., Minn. & S. M. & N. Div.:
W. E. Carroll, *Supt*..........Stevens Point, Wis.
Worcester & Nashua; and Nashua & Rochester R. Rs.
4–8½ g. 95 m. 20 lo. 505 cars.
C. S. Turner, *Pres. & G. Man.* Worcester, Mass.
G. W. Hurlburt, *Supt*..........Worcester, Mass.
John G. Brady, *M. M. & C. B.* Worcester, Mass.
Worcester & Shrewsbury R. R. 3 g. 3 miles.
Worcester & Somerset R. R. 4–8½ g. 10 m. 1 lo. 4 c.
J. J. Coburn, *Supt*...............Worcester, Mass.
G. E. Hapgood, *Pur. Agt*....Worcester, Mass.
Chas. Cleveland, *M. M*.........Worcester, Mass.

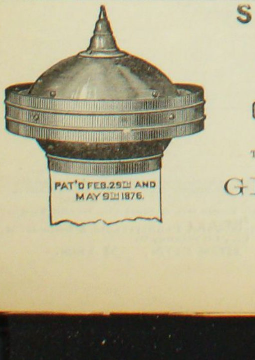
The Sheffield Velocipede Hand-Car



This Hand-Car is especially adapted to the use of **Road-Masters, Bridge Inspectors, Telegraph Line Repairers, Track Inspectors, Track Walkers, Wood** and **Tie Inspectors,** and for all work where one or two men wish to go over the line at will. Also, our Telegraph Cars, capable of carrying two men and material. Light, Easily Handled, and when ready for shipment occupy very little space in Baggage Car—a great advantage to railroad men. Run easily, being propelled by the **ROWING MOVEMENT.** Can be run short distances at the rate of **20 Miles an hour; and will not jump the track.**

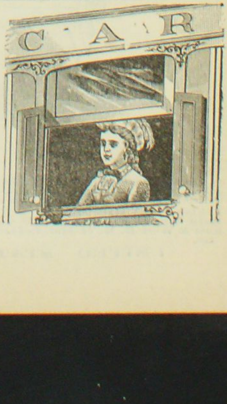
HENRY W. PEABODY & CO.,
114 STATE STREET, BOSTON,
GENERAL PURCHASING AGENTS
For Foreign Railway and Tramway Companies

SIMPLE, DURABLE AND CHEAP


PAT'D FEB. 29TH AND MAY 9TH 1876.

GLOBE
VENTILATORS,
For Ventilation of
Cars, Depots, Round-Houses
AND
WATER CLOSETS.
Twenty-five Sizes, from 2 in. to 48 in. inclusive.

GLOBE DEFLECTORS,
FOR
PREVENTING DUST OR CINDERS FROM ENTERING CARS.



MANUFACTURED BY THE
GLOBE VENTILATOR COMP'Y,
203 River Street, - - - - TROY, N. Y.
Catalogue and Price-List Furnished on Application.

ESTABLISHED 1852.

LAKE ERIE IRON CO.,

MANUFACTURERS OF

MERCHANT AND CAR IRON,

STEEL AND IRON FORGINGS OF EVERY DESCRIPTION.

STANDARD CAR AXLES

☞ Steel Axles and Forgings a Specialty. ☜

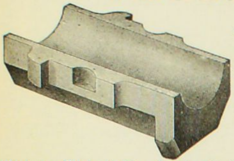
LOCOMOTIVE AXLES

Locomotive Frames, Piston Rods, Engine and Mill Shafting, Bolts, Nuts and Washers.

TRACK BOLTS, with Square or Hexagon Nuts. CLEVELAND, OHIO. **BRIDGE BOLTS** Plain or Upset Ends.,

WM. S. BOSTWICK. W. W. YOUNG.

WM. S. BOSTWICK & CO.



Bronze & Brass Foundry.

Engine, Locomotive, Car & Rolling Mill Brasses

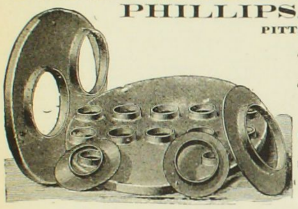
Correspondence solicited from Car-Builders.

Thirty-Third St. & A. V. R. R. - PITTSBURGH, PA.

SLIGO ROLLING MILLS.

PHILLIPS, NIMICK & CO.,

PITTSBURGH, PA.,



MANUFACTURERS OF

"Sligo" Boiler Plate and Fire-Box Iron.

"Sligo" Bar, Band, Sheet and Angle Iron.

"Sligo" Stay Bolt Iron,

Used by the Principal Railroads in the United States, and Warranted Unexcelled.

"TYRONE" BRAND BAR SHEET, TANK PLATE and ANGLE IRON.

Quality our Specialty.

BOILER HEADS AND FLUE HOLES FLANGED TO ORDER.

SEND FOR PRICE-LIST.

ESTABLISHED 1783.

DRAWING INSTRUMENTS, Swiss, German Silver and Brass. **DRAWING PAPER** and **DRAUGHTSMAN'S MATERIALS** of all kinds.

Blue Process Paper, Etc.

W. MITCHELL McALLISTER, 728 Chestnut St., Philadelphia.

Catalogue on application. Mention this journal.

C. P. LELAND, Pres. E. M. GRANT, Gen. Manager.

THE CLEVELAND CRUCIBLE STEEL CO.,

MANUFACTURERS OF

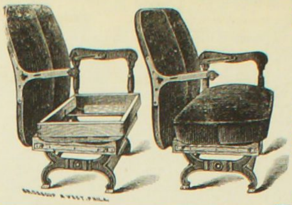
STEEL,

TOOL, FILE, SPRING, MACHINERY,

CLEVELAND, OHIO.

AGENTS: Boston, Jas. J. Kelly, 38 Kilby St.; Chicago, Campbell & Lill, 228 Lake St.; New York, Temple & Lockwood, 12 Platt St.; Cincinnati, Jno. C. Erb & Co., 10 West Third St.; St. Louis, W. C. Kennedy, 312 North Second St.

COMFORT AND ECONOMY.



Mason's Patent Improved Car Seat,

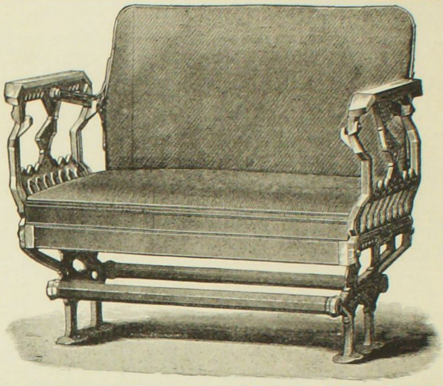
THE PENNSYLVANIA.

NO BREAKING BY REVERSING RAPIDLY. HUNDREDS OF COACHES SEATED WITH THIS CAR SEAT.

Is the Penna. R. R. Standard Eastlake seat, and used extensively by the Lehigh Valley, C., B. & Quincy, Savannah, Florida & Western, and many other railroads. It meets the long needed want of a reversible seat that elevates the cushion in front, and also makes it wider. Without hinges, cams, or any other mechanical appliance. Works automatically. Address

C. C. MASON,

Lock-Box 144. **ALTOONA, PA**



THE WAKEFIELD RATTAN CO., BOSTON,

call the attention of Railroad officers and Car-Builders to their new and perfected

RATTAN CAR SEATS AND BACKS.

For long routes and first-class cars the seats we are now making with SPRINGS in both seats and backs, as shown in above cut, are very popular, and are especially desirable for Summer travel, being clean, comfortable and cool.

For short routes and smoking cars our regular

RATTAN SEAT AND BACK, without Springs,

has always given perfect satisfaction, as they keep clean, wear longer and have none of the objections that plush and like materials have.

Catalogues and estimates furnished on application to the

WAKEFIELD RATTAN CO.,

115 WASHINGTON STREET, BOSTON.

Samples may be seen at the stores of the Company: 8 Park Place, New York; 144 and 146 Wabash Avenue, Chicago; 644 Market Street, San Francisco.

J. B. WINSTANDLEY, Pres. GEO. E. SACKETT, Sec. and Treas. J. T. WRIGHT, Supt

New Albany Steam Forge,

MANUFACTURERS OF

STANDARD CAR AXLES

AND

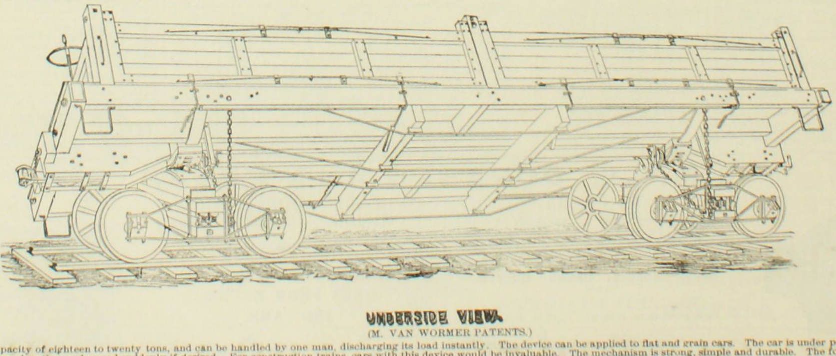
LOCOMOTIVE AXLES

Crank Pins, Equalizers, Slide-Bars, Connecting, Parallel and Piston Rods. Heavy Forgings of all Kinds of Iron and Steel.

Office and Works, New Albany, Ind.

THE U. S. CAR CO.'S SCREW LEVER DUMP AND COAL CAR.

L. C. VAN WORMER, General Manager. M. VAN WORMER, Superintendent.



UNDERSIDE VIEW.

(M. VAN WORMER PATENTS.)

This car has a capacity of eighteen to twenty tons, and can be handled by one man, discharging its load instantly. The device can be applied to flat and grain cars. The car is under perfect control at all times, and can be held at any elevation or dumped suddenly if desired. For construction trains, cars with this device would be invaluable. The mechanism is strong, simple and durable. The following railroads and car-builders are building cars with this screw lever attachment, viz.:

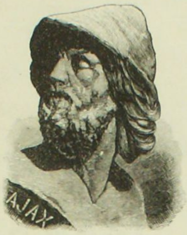
Lehigh Valley Railroad.
Main Central Railroad Co.
East & West R. R. of Ala., Cedartown, Ga.
Northern Pacific Railroad Co.
Gilbert Car Mfg. Co., Troy, N. Y.
Boston & Maine R. R. Co.
Wells & French Car Co., Chicago.
Cleveland Rolling Mills Co., Cleveland.
Gill Car Mfg. Co., Columbus, Ohio.
St. Louis Ore & Steel Co., Grand Tower, Ill.
New York, Pennsylvania & Ohio R. R. Co., Cleveland, O.

UNITED STATES CAR COMPANY, 48 CONGRESS STREET, BOSTON, MASS.

IMPORTANT

TO
MASTER
CAR-BUILDERS.

TRADE



MARK.

TO
MASTER
MECHANICS.

Philadelphia, Pa., August 1, 1883.

Gentlemen :

We respectfully invite your special attention to the use of AJAX METAL for BEARINGS, which we are at present supplying to many Railroads, both in this country and in Europe, and securing the best results. We are in a position to fill orders promptly for INGOTS or CASTINGS, or for the AJAX WHITE METAL, which can be used in a composition as tin is with copper, giving at least 50 per cent. greater mileage, LESS FRICTION AND LESS JOURNAL WEAR, at a cost not exceeding that of copper and tin, or gun metal.

We are now supplying monthly, the

New York Central & Hudson River Railroad,
Philadelphia & Reading Railroad,
Columbus, Hocking Valley & Toledo Railroad,
Delaware, Lackawanna & Western Railway,
Pittsburgh, Cincinnati & St. Louis Railway,
Lake Shore & Michigan Southern Railway,

and, in smaller quantities, about fifty other railroads. From all these we receive substantially one report: "IT IS THE BEST BEARING METAL WE EVER USED."

The greatest obstacle we have heretofore met with in introducing this metal has been its high cost in pig. This is now overcome by making the "AMALGAM" in white metal, so that it can be used by any moulder and produce as good castings as from the ingot.

Mr. F. J. Clamer, metallurgist and discoverer of the AJAX METAL, is associated with us and has charge of the manufacture.

We are willing to GUARANTEE a saving of from 25 to 50 per cent. in the cost of bearings on any road using the Ajax Metal, and we ask you to try a small lot of our No. 1 AJAX WHITE METAL, AT MARKET PRICE OF TIN, with our formula for making the composition.

J. G. HENDRICKSON,
F. J. CLAMER,
FRANK BUSHNELL,
Co-partners.

Respectfully,
THE AJAX METAL COMPANY.

THE AJAX METAL COMPANY,

14 NORTH FIFTH ST., PHILADELPHIA.

HOYT & BROTHER MFG. CO.,

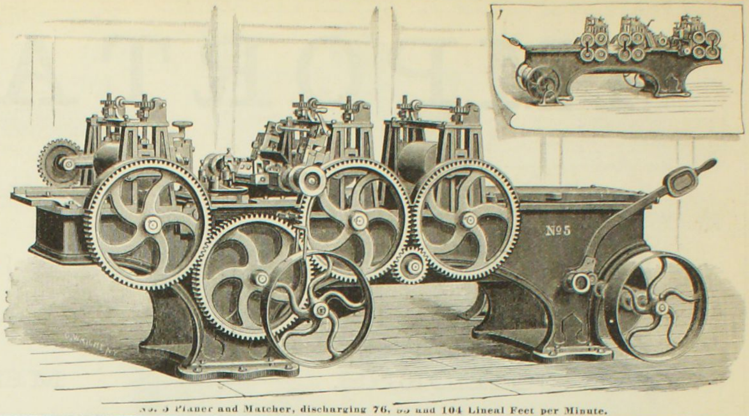
Aurora, Illinois,

MANUFACTURE

PLANERS, MATCHERS,
ENDLESS BED SURFACES,
AND
General Machinery for Working Wood.
ALSO
SHAFTING, PULLEYS, HANGERS,
PILLOW BLOCKS, ETC., ETC.

Our New Illustrated Circular is valuable as a Reference Book, and will be mailed on application. Address

Hoyt & Brother Mfg. Co.,
AURORA, ILLINOIS.



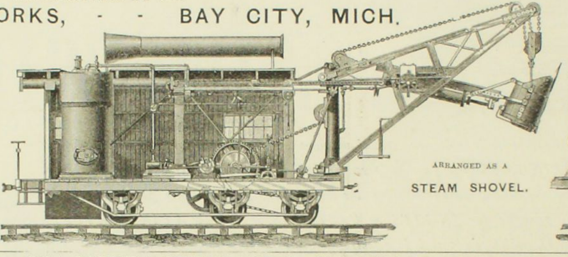
No. 5 Planer and Matcher, discharging 76, [illegible] and 104 Lineal Feet per Minute.

1882.--IMPROVED IRON STEAM SHOVEL AND DERRICK.

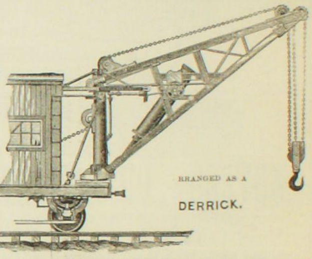
MANUFACTURED BY THE
INDUSTRIAL WORKS, - - BAY CITY, MICH.

TURN-TABLES
OF
Iron and Wood.

C. R. WELLS, Sec'y, Bay City, Mich.
McMANN & BRO., 58 Gold st., N. Y.



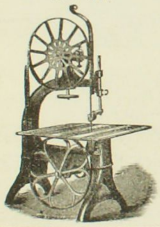
ARRANGED AS A
STEAM SHOVEL.



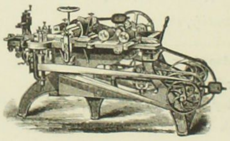
ARRANGED AS A
DERRICK.

MANUFACTURERS OF WOOD-WORKING MACHINERY.

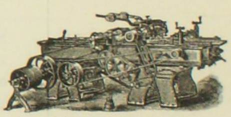
BAND SAW.



OUTSIDE MOLDER.



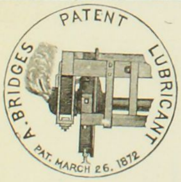
INSIDE MOLDER.



The Latest Improved
MACHINERY
for
Railroad Car Shops.

Planers, Vertical
Car Tenoners,
Gaining,
Tenoning,
Rotary Mortising Machines.

C. B. ROGERS & Co., MANUFACTORY, NORWICH, CONN.
WAREROOMS, 109 Liberty St., New York.



HOT JOURNALS ENTIRELY PREVENTED.

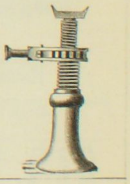
BRIDGES' LUBRICANT

FOR RAILROAD CAR JOURNALS AND OTHER BEARINGS.

SAMPLES FURNISHED GRATIS. SEND FOR CIRCULAR.

Manufacture Ball's Telescopic Screw Jack.

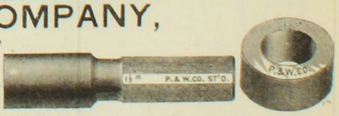
JOHN S. URQUHART, Successor to
ALBERT BRIDGES 46 CORTLANDT STREET NEW YORK.

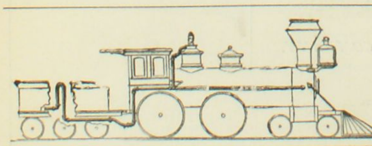


THE PRATT & WHITNEY COMPANY,

HARTFORD, CONNECTICUT, U. S. A.,
MANUFACTURERS OF
MACHINISTS' TOOLS AND SPECIAL MACHINERY.

Machine or Nut Taps, Hand and Stay-Bolt Taps; Gauges for the Franklin Institute or U. S. Standard System of Screw Threads, adopted by the Master Mechanics and Master Car-Builders' Association; also Plain, Cylindrical Size Gauges, Hardened and Ground and Warranted Standard.


P. & W. CO. ST'D.
P. & W. CO.



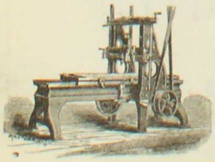
THE ASHTON VALVE COMPANY,

271 Franklin Street, Boston, Mass.

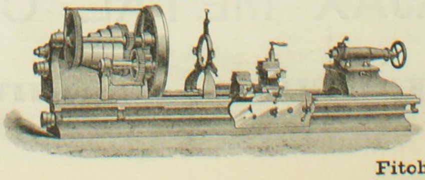
The Ashton Blow-back Safety-valve is constructed so as to conduct the escape steam which is blown off back to the tender, or to the smoke-box and up the chimney. By this arrangement the heat of the escape steam, instead of being wasted as it is when an ordinary safety-valve blows off, is communicated to the cold water in the tender. This not only results in an important economy, but it renders the escaping steam noiseless, and the increase of temperature of the water has a tendency to deposit some of its impurities before it is pumped into the boiler. It thus *stops the noise! saves fuel! and all engines steam better and faster, and do more effective work with these valves* than with those in ordinary use.

FITCHBURG MACHINE WORKS.

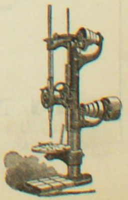
MANUFACTURERS OF



MACHINISTS'



TOOLS.



Nos. 13 to 21 Main St. **Fitchburg, Mass.**

JAMES JEFFRIES & SONS,

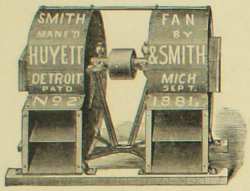
MANUFACTURERS OF

ELLIPTIC & HALF ELLIPTIC CAST-STEEL SPRINGS,

For Railroad Cars and Locomotives.

813 JAYNE STREET, PHILADELPHIA, PA.

The Smith Exhaust Fan



FORGE AND PRESSURE BLOWERS.

Best in the World.

Cheapest in the World.

SAVES 5 PER CENT. OF POWER APPLIED

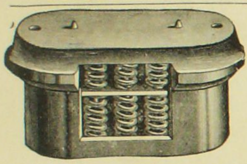
As against other kinds of Exhaust Fan.

Send for Catalogue and Price List to

Huyett & Smith Manufacturing Co.,

PATENTEES AND SOLE MANUFACTURERS,

P. O. Box 466. DETROIT MICH.



The "A. B. Davis" Car Spring,

MANUFACTURED AND FOR SALE BY

A. B. DAVIS CAR SPRING CO.

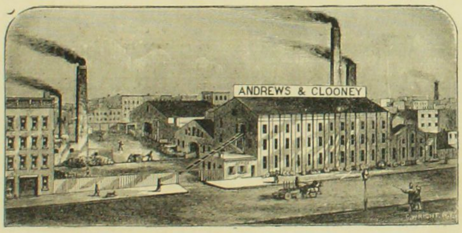
(Limited),

S. W. Cor. 23d and Hamilton Sts.

PHILADELPHIA.

ANDREWS & CLOONEY,

GLOBE IRON AND COLUMBIA CAR SPRING WORKS.



**Office, 545 West Thirty-third Street; Works, 535 to 551 West Thirty-third Street and 538 to 552 West Thirty-fourth Street,
NEW YORK.**

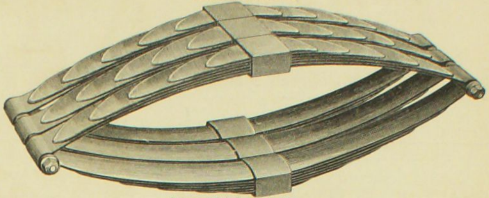
Manufacturers of Elliptical, Spiral, Volute Car and Engine Springs, Car Wheels, Axles, Pedestals Brake Shoes, Boxes, Brass Bearings and Castings of all descriptions where great strength is required. Also, Sweepers Snow-Plows, Turn-tables, Automatic Switches, Track Work, etc.

HON. W. T. MINOR, Pres. JOHN F. MOULTON, Vice-Pres. WILLIAM DAVISON, Sec'y. CHARLES W. MINOR, Treas

U. S. CONCAVE SPRING CO.,

Duncan Building, No. 11 Pine St., Room 34, New York, N. Y.

MANUFACTURERS OF



Patented Feb. 8, Aug. 2, 1881.

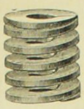
Crucible Cast Steel Concave Elliptic Springs, for Railroad Cars and Locomotives.

CURRAN DINSMORE, General Sales Agents. CHARLES H. TWIST.

DIAMOND STATE CAR SPRING WORKS.

Licensed to Manufacture the Edge Rolled Equalizing Beam, Draw and Buffer Spring.

Eureka Edge Rolled Buffer, or Draw-Spring.

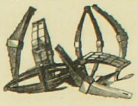


Patented July 7, 1874.
Reissue March 9, 1875.

Manufacturers of
Elliptics, Locomotive and Improved Flat and Round Bar

NEST SPRINGS,

Of the Best Grade of Cast Spring Steel.



Jas. P. Hayes & Co.,

WILMINGTON, DEL.

SPIRAL SPRINGS

Of Every Description.

G. WADLEY, President. THEO. PLUMMER, Sec. and Treas

NASHVILLE LUMBER CO.,

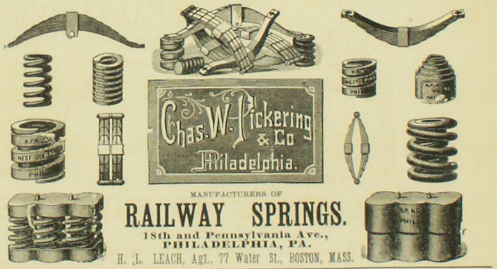
MANUFACTURERS AND DEALERS IN

SOUTHERN YELLOW PINE CAR SILLS AND BRIDGE TIMBERS, KILN DRIED FLOORING AND LUMBER.

Dry Yellow Poplar and White Ash always in Stock.

NASHVILLE, TENN.

Mississippi Branch. - - Wesson, Miss



MANUFACTURERS OF

RAILWAY SPRINGS.

**18th and Pennsylvania Ave.,
PHILADELPHIA, PA.**

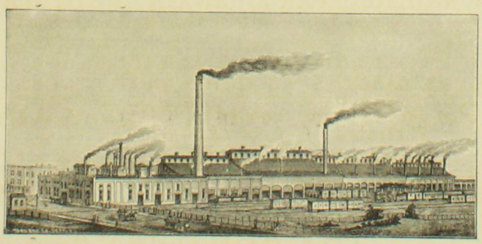
H. L. LEACH, Agt., 77 Water St., BOSTON, MASS.

DETROIT STEEL WORKS

MANUFACTURERS

OF

STEEL.



SPRING

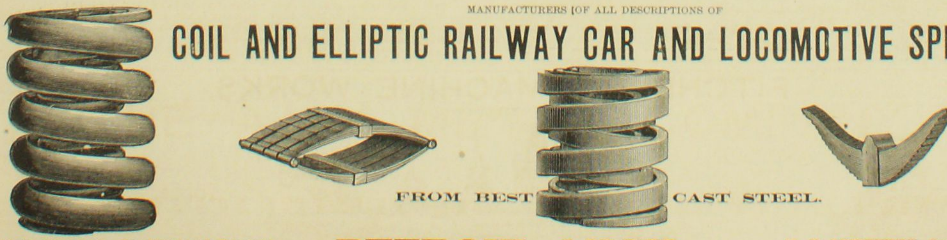
STEEL

A SPECIALTY.

DETROIT CAR SPRING CO.,

MANUFACTURERS OF ALL DESCRIPTIONS OF

COIL AND ELLIPTIC RAILWAY CAR AND LOCOMOTIVE SPRINGS



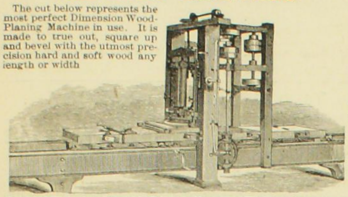
FROM BEST CAST STEEL.

ALEX DE LANO, President and Manager. DETROIT, MICH. **H. R. NEWBERRY, Secretary.**

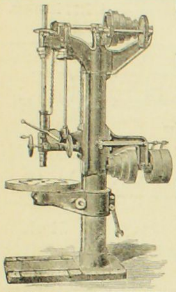
PARROTT VARNISH COMPANY,
MANUFACTURERS OF FINE
RAILWAY VARNISHES,
BRIDGEPORT, CONN.

DANIELS PLANERS.

The cut below represents the most perfect Dimension Wood-Planing Machine in use. It is made to true out, square up and bevel with the utmost precision hard and soft wood any length or width

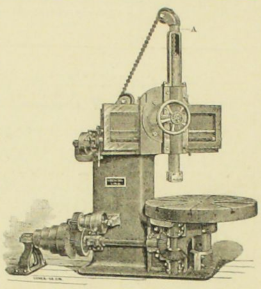


WOOD-WORKING MACHINERY,
MANUFACTURED BY
WITHERBY, RUGG & RICHARDSON. Worcester. Mass.,
26 SALISBURY STREET. (Shop formerly occupied by R. BALL & CO.
SPECIALTIES:
Woodworth Planing, Tonguing and Grooving Machines, Daniels Planers, Richardson's Patent Improved Tenon Machines, Mortising, Molding, Re-saw and Band Saw Machines, Picture Frame and Miter Cutting Machines, Box Machinery,
PATENT DOUBLE SAW BENCHES, SAW TABLES, &c.



MACHINISTS' TOOLS,
Upright Drills
BORING
AND
Turning Mills
A Specialty.
H. BICKFORD,
Cincinnati, O.,
U. S. A.

Prices and Photographs on Application.

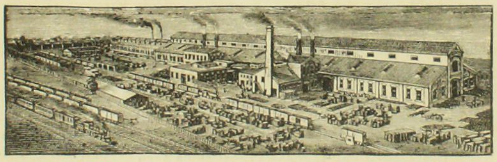


THE PATENT SHAFT AND AXLETREE CO.
(LIMITED),
OF WEDNESBURY, ENGLAND,
MANUFACTURERS OF
Wrought-Iron Steel Tyred Engine and Car Wheels, Iron and Steel Axles, Locomotive and Car Wheel Tyres, Etc., Etc.
Represented in the United States by
W. R. ELLIS.
NEW YORK: No. 72 WALL STREET.
BOSTON: No. 139 MILK STREET.

BOUND VOLUMES OF THE NATIONAL CAR-BUILDER
For 1880, 1881 and 1882. Price, $3 each.

GEORGE F. COCHNOWER, Boston, Mass.
NELSON A. MORKILL, Sherbrook, P. Q.
GEO. F. COCHNOWER & CO.,
CONTRACTORS AND DEALERS IN
NEW AND OLD RAILWAY EQUIPMENT AND SUPPLIES,
15 OLIVER, STREET BOSTON, MASS.
General Purchasing Agents for Canadian and other Foreign Railways.

GRIFFIN CAR WHEEL CO.
RAILROAD CAR WHEELS AND CASTINGS.
ANNUAL CAPACITY, 100,000 WHEELS; 10,000 TONS CASTINGS.

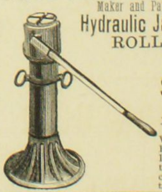


OFFICE AND WORKS:
Cor. Foundry St. and Michigan Central R. R.
DETROIT, MICH.

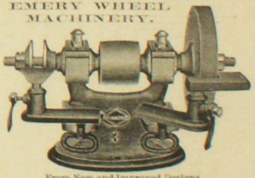
CURLED HAIR.
GLUE.
SAND PAPER.
EMERY CLOTH.
MANUFACTURED BY
BAEDER, ADAMSON & CO.
New York, 67 & 69 Beekman St.
PHILADELPHIA, 730 MARKET STREET.
BOSTON, 143 MILK STREET.
CHICAGO, 182 LAKE STREET.
CINCINNATI, 8 & 10 WEST PENN ST.
FELTING FOR REFRIGERATOR CARS AND BOILERS.

THOS. F. GRIFFIN & SONS,
CAR WHEELS AND CASTINGS.
OFFICE AND WORKS:
COR. FOREST AVE. AND N. Y. C. & H. R. R. R.,
BUFFALO.

RICHARD DUDGEON,
No. 24 Columbia St., New York,
Maker and Patentee of IMPROVED
Hydraulic Jacks, Punches
ROLLER-TUBE
EXPANDERS,
AND
DIRECT ACTING
Steam
Hammers.
JACKS FOR PRESSING ON CAR-WHEELS OR CRANK PINS MADE TO ORDER. Communications by letter will receive prompt attention.

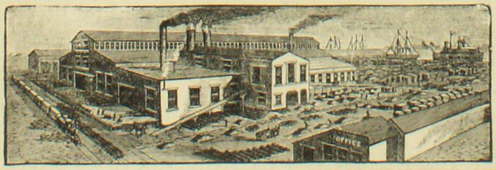


EMERY WHEEL MACHINERY.

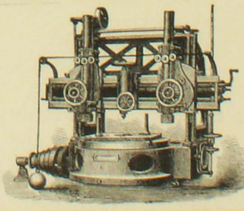


From New and Improved Designs.
DIAMOND SOLID EMERY WHEEL.
Hadley's Pat. Counter Shaft and Belt Shifter.
Send for Illustrated Catalogue.
Diamond Emery Wheel & Machine Co., Providence R. I.
275 S. Canal St., - Chicago

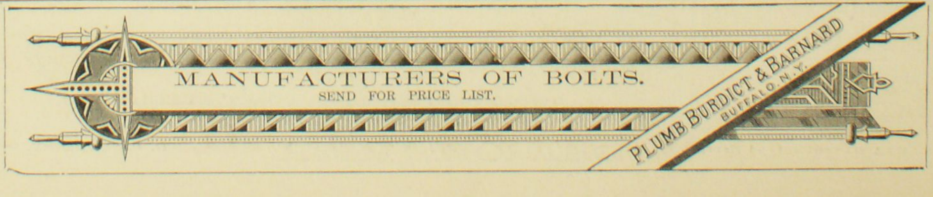
Griffin & Wells Foundry Co.
Railroad Car, Engine and Street Car Wheels.
ANNUAL CAPACITY, 50,000 WHEELS.



CONTRACTS MADE FOR YEARLY OR OTHER SUPPLY. MILEAGE OR TIME GUARANTEE GIVEN.
OFFICE & WORKS:
Paulina St., south of Blue Island Av.,
CHICAGO.



NILES TOOL WORKS,
Hamilton, Ohio.
MACHINE TOOLS
FOR
Railroad, Locomotive and Car Shops.
ALL FROM NEW AND IMPROVED PATTERNS
PRICES AND PHOTOGRAPHS ON APPLICATION.
Eastern Office, 22 South Sixth St., Phila.



MANUFACTURERS OF BOLTS.
SEND FOR PRICE LIST.